NewFeed

NewFeed

Feeder

Protection Relay

User Manual

Revision 01C-00

13 December 2023

Contents

Description Page

1 DEFINITIONS, CONVENTIONS AND TERMINOLOGY

Term	Abbreviation	Description
Phase Identification Subscript	L1, L2, L3	Line 1, 2 & 3, which could be Voltage (V) or Current (I). Variously described by colour as Brown/Black/Grey (in EU) or Red/White/Blue or Red/Yellow/Blue phases (older/national colour conventions)
Protective Earth	PE or E	Earth conductor / Earth
Neutral	LN	Line-neutral conductor / Neutral
Warning flag	WF	Warning flag is set when a set point for an ANSI protection function is exceeded, this is done weather the protection function is enabled or not. Very useful to allow one to always monitor the operation state of a system. Warning flags are not recorded in the event records but can be monitored in real time SCADA.
Alarm Flag	AF	If an ANSI protection function is enabled the Alarm flag is set when the set point of the protection function is exceeded. It is immediately recorded in the event record and is time and date stamped. It is the starter element to initiate a trip on the respective ANSI function trip delay, should it remain active or set for the full duration, the protection relay will be tripped out on the respective ANSI function.
Trip Flag	TF	If an ANSI protection function is enabled the Alarm flag is set and remains active, and the pre-set trip delay has been timed out, a Trip command is issued (TF is set) and is recorded time and date stamped. The Trip Flag will be latched and requires to be reset manually or via PLC.
System Flag	SF	System flag is used to indicate the status of logic function, timer, and comparator outputs. The SF is used to provide powerful logic and conditional statements for control or system tripping matrix.
Event record	-	Any event (i.e. Power Up, Power Down, Settings Change, Starts, Stops, Alarms or Trips) that has occurred it is recorded in a time and date stamped event record.
Fault record	-	Subset of Events – refers only to Trip events recorded in a time and date stamped trip record.
RMS		Root Means Square which is the effective value of the variable, which is either Current or Voltage.
T-bus	-	A connecting device used to connect NewFeed IED with expansion modules such as RTD, DIO and 4 to 20mA control modules within the DIN rail cavity.
Remote Temperature Sensor	RTD	Resistor element that exhibits a direct relationship between temperature and its resistance value in ohms examples of which are PT100, PT1000, PTC, NTC devices

Term	Abbreviation	Description
Live, Neutral	L, N	Is used to refer to the Live wire and Neutral, often on a single phase system for powering control circuits
SCADA	-	Supervisory Control and Data Acquisition, is a software system generally used in a central control station to visualize what is happening in an operating equipment or plant
ANSI Codes	-	American National Standards Institute (ANSI) codes are numeric or alphabetic codes issued to normalize identification and understanding of various aspects and functions, in this context of electrical protection functions of relays
Programmable Logic Control	PLC	Is a set of hardware used to interface instruments, compute and interpret their information and effect control of the process or drives
Thermal Capacity	TC	Is a calculation used to estimate the heat accumulated inside an electrical equipment housing, such as motor or transformer based on a I2T thermal modelling system
Voltage Transformer	VT	Voltage transformer used to isolate and reduce high voltages to a safe and usable level for low voltage electrical instruments
Current transformer module block	CTMB01	A 3-phase voltage and current transformer module block with current transformer primary winding single turn 12mm up to 50 amp or 22 mm in diameter conductor 100 to 300 amp. The secondary windings are terminated as individual differential signals. The voltage measurements are resistor attenuated voltage divider capable of direct measurements up to 550-volt line values. Connecting the CTMB01 to the NewFeed relay is done via individual 10-way ribbon cables with common mode choke.
Full load current setting	MLC	Maximum load current set point (I_S) of motor, generator, feeder panel or transformer
Thermal Capacity	TC	The estimation of the thermal capacity left in motor / transformer or any equipment, before failure.
Event	Event	Any event (i.e. Power Up, Power Down, Settings Change, Starts, Stops, Alarms or Trips) that has occurred it is recorded in a time and date stamped event record.
Total Harmonic Distortion	THD	The total harmonic distortion is a measurement of the harmonic distortion present in a signal and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency.
Device	Device	The device or equipment (motor, feeder, transformer, generator etc.) being protected by the NewFeed relay
Trip Flag	TF	If an ANSI protection function is enabled the Alarm flag is set and remains active, and the pre-set trip delay has been timed out, a Trip command is issued (TF is set) and is recorded time and date stamped. The Trip Flag will be latched and requires to be reset manually or via PLC.

Term	Abbreviation	Description
System Flag	SF	System flag is used to indicate the status of logic function, timer, and comparator outputs. The SF is used to provide powerful logic and conditional statements for control or system tripping matrix.
Root Mean Square	RMS	Root Means Square which is the effective value of the variable, which is either Current or Voltage.
LED	LED	Light Emitting Diode

2 OVERVIEW

The NewFeed Relay is an ISO 9001:2015 compliant; IED (Intelligent Electronic Device).

Targeting motor and feeder protection in both the LV and MV environment multiple curve selections as well as positive, negative and zero sequence protection.

It is a micro-controller-based precision instrument with ANSI protection elements, advanced control features and switchgear controller logic integrating motor and feeder control functions with prestart, close command execution time and continuous breaker state monitoring with load current feedback to detect unauthorised operation or starting as well as breaker failure detection.

The relay is designed targeting motor and feeder protection in both the LV and MV environment multiple curve selections as well as positive, negative and zero sequence voltage and current as well as phase angles are measured as well as integrated into most relevant ANSI protection features, which can be set in disabled, warning or trip protection mode, a variety of MV and LV current transformer module blocks (CTMB) caters for different current ranges as well as easy interfacing to higher current and system voltages using interposing current transformers and voltage transformers the ratios of which are selectable on the configuration software caters for the full isolation as well as flexible range settings.

The instrumentation current transformers module block interfacing with main current and voltage transformers made for a flexible robust interface, an external core balance current transformer caters for sensitive earth leakage detection.

The relay is fully configurable with the aid of NewFeed configuration front-end software. Event records can also be downloaded with the aid of the laptop software onto a memory stick for further analysis. The relay has an on-board database where time and date stamped records are kept. Two types of records are kept namely fault records (36 last faults) and event records (940 events). In the case of event records, the user has limited access rights (read only). The NewFeed has an on board front-end also has a data recorder and a spectrum analyser, which could be used to analyse motor performance and supplied power quality respectively. The spectrum analyser can detect harmonics up to the 9^{th} on any of the three phase currents.

The relay measures both the zero sequence currents in the load current supply as well as the earth leakage currents with the aid of the external core balance current- transformer.

A unique feature is added to the relay in the form of simulation. This function could be used for personnel training or relay functionality testing.

The prize feature is the memory module which can be use in one of three ways

The storage of NewFeed relay configuration settings last downloaded to the NewFeed relay using the configuration software. This provides a nonvolatile storage of all configuration and protection settings that can be transferred into a new replacement relay.

The sequence is as follow:

1. Press the reset button 4 times.
2. All the fault indication LED’s will come on (excluding healthy and in service LED’s).
3. Press the reset button once to read the settings and communications configurations from the memory module to the NewFeed relay. Else wait for next indication sequence (4).
    a. After pressing the reset buttons the LED indication will scroll from the bottom upwards.
    b. After upload is successful the LED indication will go back to normal operation.
    c. If not successful, then the LED indication will flash at a 1 second interval.
4. Only the top 4 of the 8-fault indication LED’s will come on (excluding healthy and in service LED’s)
5. Press the reset button again to read settings from the memory module to the NewFeed relay. Only the communication block will not get overwritten. Else wait for next LED indication sequence (6).
    a. After pressing the reset buttons the LED indication will scroll from the bottom upwards.
    b. After upload is successful the LED indication will go back to normal operation.
    c. If not successful, then the LED indication will flash at a 1 second interval.
6. Only the bottom half LED indication will come on excluding healthy and in service.
7. Press the reset button again to write all settings from the NewFeed relay to the memory module. Else wait to exit menu.
    a. After pressing the reset buttons the LED indication will scroll from the top downwards.
    b. After upload is successful the LED indication will go back to normal operation.
    c. If not successful, then the LED indication will flash at a 1 second interval.

!!!! WARNING !!!!	
	Do not change settings while switch gear is **not** isolated and make sure that the NewFeed is correctly configured before operation.

3 TECHNICAL SPECIFICATIONS

Parameter	Specification
General	
Voltage (aux. power)	84~264 Vac/dc
Power consumption	2.5 Watt (relay alone)
Operating temperature	-20°C ~+65°C
Storage temperature	-30°C ~+80°C
Relative humidity	< 85%
Communication (standard)	Profibus DPV-1, Modbus RTU
Communication (option) [1]	Modbus TCP, PROFINET, IEC61850 (MMS + GOOSE)[1]
Digital outputs	Electromechanical relay (5 Amps, 240 Vac) – included in NewFeed relay 4 x Form C (common, NC / NO) configurable.
• Rated voltage	250 VAC, 30 VDC.
• Continues current	5 Amp
• Short-duration current	20 Amp for 0.5 Sec.
• Insulation distance	Dielectric strength: 4000 VAC. Surge strength: 6000 V.
• Marking capacity	1000 W (VA) at L/R = 40 milli Sec.
• Breaking capacity	0.2 Amp at 220 VDC and L/R = 40 milli Sec. (Use external RC snubber circuit to increase switch current). 3 Amp at 230 VAC and cosØ = 0.4.
• Operating time	Less than 7 milli Sec.
• Release time	Less than 7 milli Sec.
• Operation	Mechanical: 10 x 10^6 operations minimum. Electrical: 50 x 10^3 operations minimum (NO), 30 x 10^3 operations minimum (NC) at 6 Amp, 250 VAC / 30 VDC resistive.
Digital inputs	Opto-isolated, 24V AC/DC - 240V AC/DC - 7 included in NewFeed relay.
• Switch range	Nominal: 24 V AC/DC to 240 V AC/DC. Threshold in the range: 12 VAC to 13 VAC, 17 VDC to 19VDC.
• VA	19 VDC to 250 VDC 0.76 W ±30 %. > 220 VDC 2mA ±30 %
• Common mode	7 Field input signals off the NewFeed reference to 1 negative field supply common on terminal (28).
Analog inputs	Optional MEP0415 – MEP-420-02-02 2 x 4-20 mA Input and output. 4-20 mA, max 36 VDC supply, 250 Ω burden resistance.
• Value range	0.00 to 1.20 IDC, nom (IDC, nom = 20.0 mA)
• Maximum continues input current	50 mA.
• Maximum input voltage	17 VDC.
• Input load	100 Ω.
• Open circuit monitoring	0 to 10 mA (Adjustable)
• Overload monitoring	> 25 mA.
• Zero suppression	0.000 to 0.200 IDC, nom (Adjustable)
Analog outputs	Optional MEP0415 – MEP-420-02-02 2 x 4-20 mA Input and output. 4-20mA, max 750Ω loop resistance
• Output current	0 to 25 mA.
• Maximum permissible load	500 Ω.
• Maximum output voltage	15 VDC.
RTD, PTC inputs	Supports PT100, PT1000, NTC, or PTC sensors (3-wire)
Real Time Clock	24hr clock (year, month, day, hours and minutes, seconds, milli seconds)
• Backup battery	Li-ion, 50 mAh, 3.7 VDC.
• Cut off supply to battery	100 mA
• Event and fault	Time & date stamping (fault and event records)
LED fault indication	2 x mode of configuration
• 1 Logic	All 6 LED’s configurable.

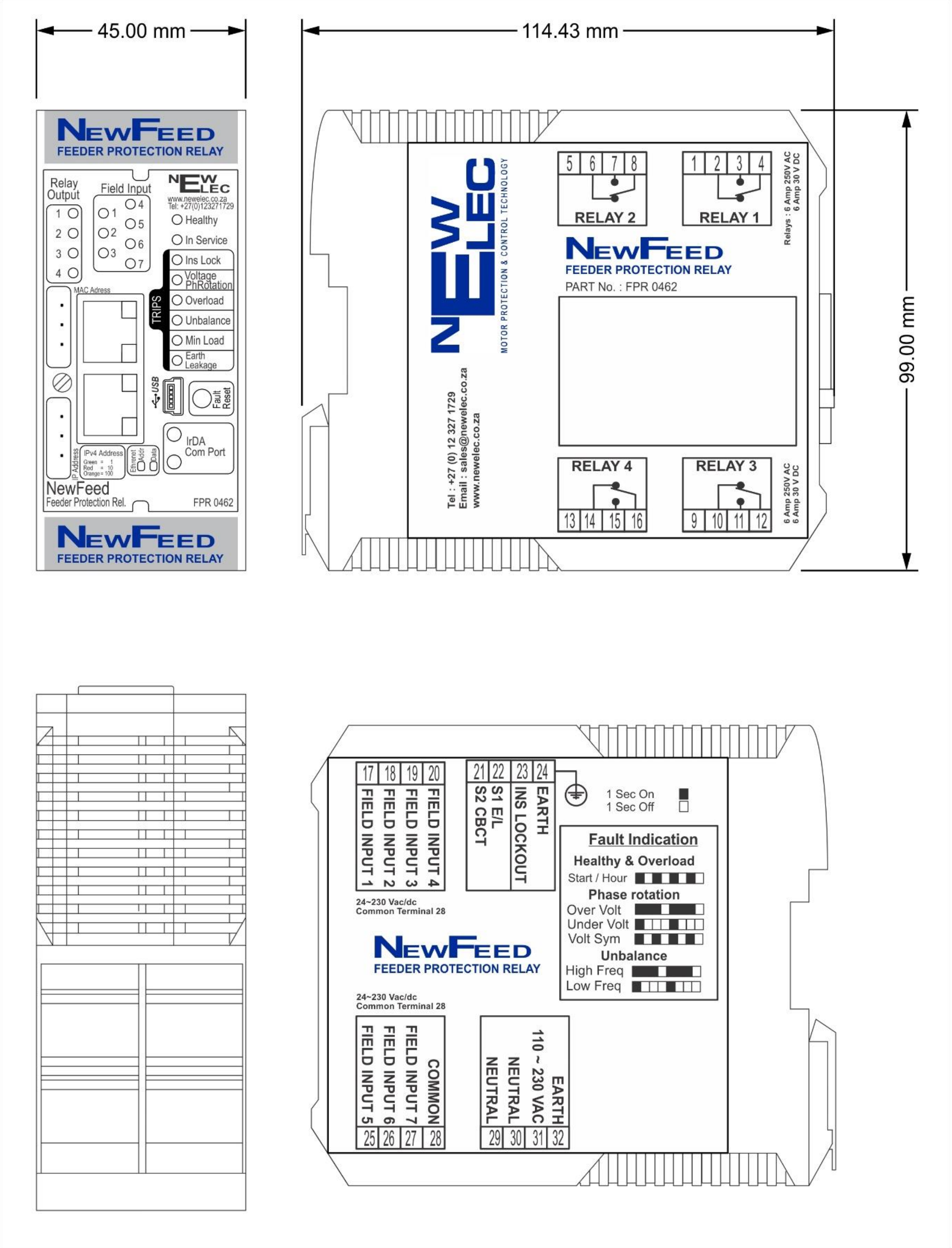
Parameter	Specification
• 2 Protection assigned	LED 1: Insulation lockout. LED 2: Voltage. LED 3: Over current. LED 4: Unbalance. LED 5: Under current. LED 6: Earth leakage. (See chapter gggg for detail ANSI fault code indication)
Mounting	DIN rail or chassis mounted
Module dimensions	Relay
• Size (W x D x H in mm)	45x113x99
• Weight (g)	245
Current Inputs – FPR0406 CTMB-05-110/550 (0.5 – 5 Amp 110 – 550 VAC conv) MV with CT self-shorting terminal.	
Normal current Inom	1A/5A/25A/50A/100A/300A AC (Model selection)
Rated frequency	40Hz~ 66Hz
Nominal consumption per phase	< 0.01VA at Inom
Measurement dynamic range	0%~ 1000% of rated current.
Accuracy	1% of set value 10 % of 1000 % range
Sampling frequency	2.4kHz (50Hz) / 2.88kHz (60Hz) – 60 samples / cycle
Voltage inputs – FPR0406 CTMB-05-110/550 (0.5 – 5 Amp 110 – 550 VAC conv) MV with CT self-shorting terminal.	
Nominal voltage Vnom	20 to 300 VAC (adjustable)
Nominal consumption per phase	< 0.44VA at Vnom = 300 VAC.
Load rating	
• Continues	350 VAC.
• For 10 seconds	600 VAC.
Accuracy	0.2% of full scale
Voltage frequency -FPR0406 CTMB-05-110/550 (0.5 – 5 Amp 110 – 550 VAC conv) MV with CT self-shorting terminal.	
Nominal frequency range	50 Hz to 60 Hz. (Selectable)
Operating range	0.95 to 1.05 fnom.
Frequency protection	40 Hz to 70 Hz.
Insulation resistance sensor	
Measurement range	1kΩ ~99kΩ
Resolution	1kΩ
Specification test summary	
IEC61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use
SABS IEC 61326-1: 2005	Electrical Equipment for measurement, control and laboratory use
IEC 60255 – 8	Thermal curve full thermal memory
Electromagnetic Compatibility (EMC) *Interference Suppression*	
CISPR 22	Radiated Emissions Pass Class A
CISPR 22	Conducted Emissions (Power Leads) Pass Class A
Immunity to Electrostatic Discharge	
IEC 61000-4-3	Radiated, radio frequency, electromagnetic field immunity test Pass Criteria A
Electrical Fast Transient or Burst Requirements	
IEC 61000-4-4	Electrical Fast Transient / Burst Pass Criteria B
Current/Voltage Surge Immunity Test	
IEC 61000-4-5	Surge immunity test Pass Criteria A
Immunity to Conducted Disturbances Induced by Radio Frequency Fields	
IEC 61000-4-6	Immunity to conducted disturbances, induced by radio-frequency fields Pass Criteria A

Parameter	Specification
IEC 61000-4-11	Voltage dips Pass Criteria B
IEC 61000-3-2	Harmonic Current Emissions Pass
IEC 61000-3-3	Voltage changes, voltage fluctuations and flicker Pass

4 PARTS AND DIMENSIONS

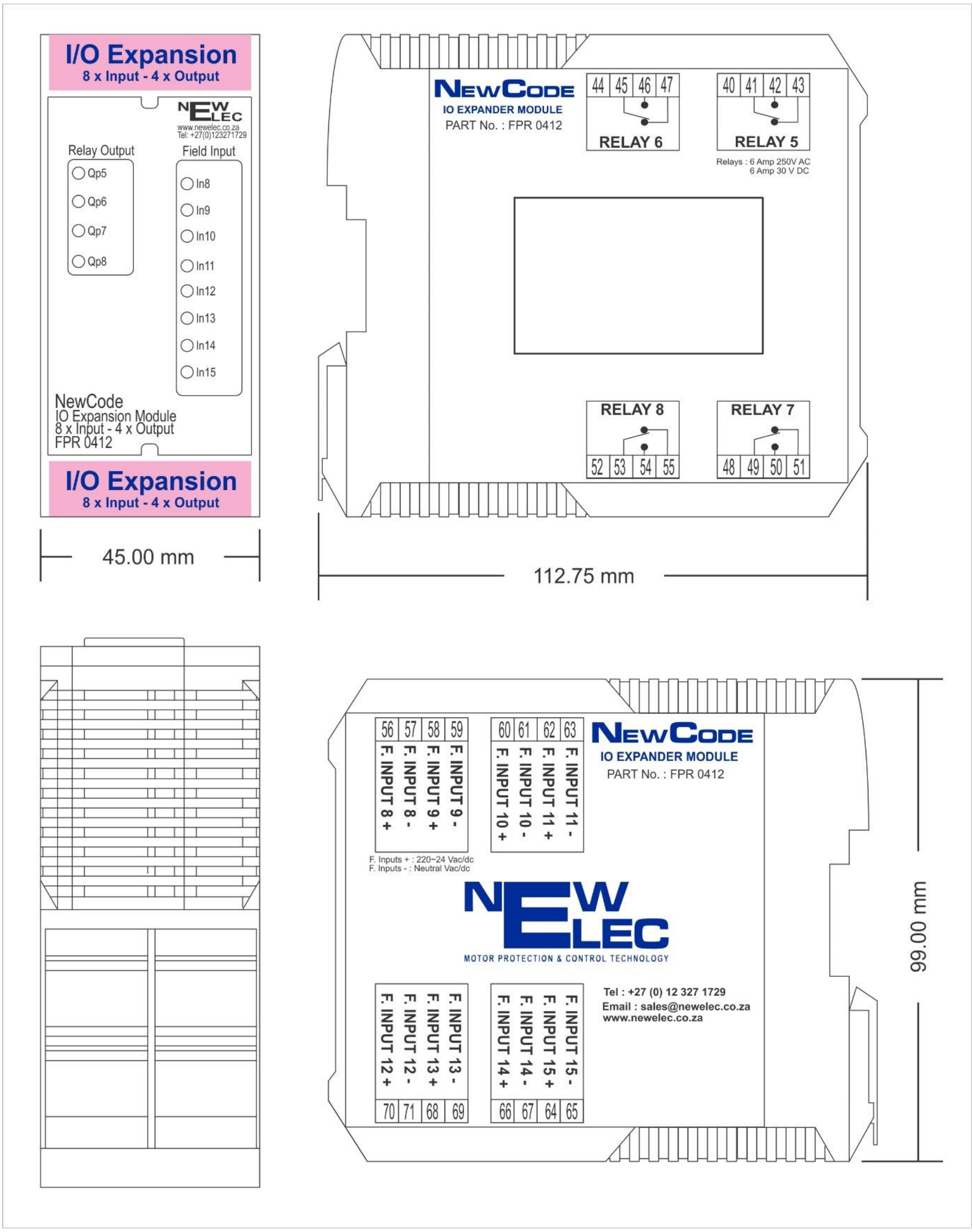
4.1 FPR0462 – NewFeed Relay

FPR0462, NewFeed with PROFINET and Modbus/TCP



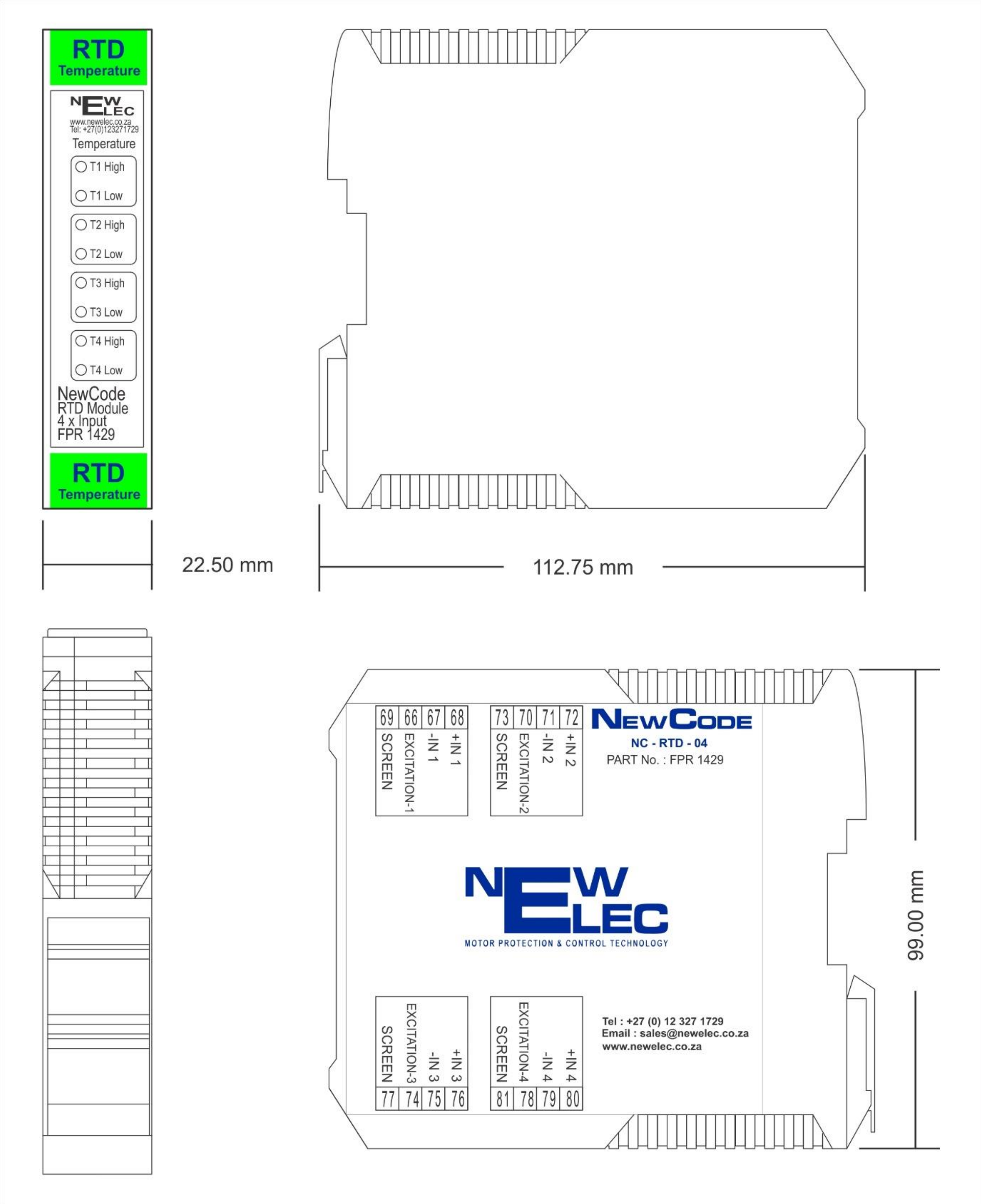
4.2 FPR0412 - Digital IO expander module

FPR0412, Digital I/O expansion module with eight field Opto-isolated, 24Vac/dc - 240Vac/dc digital galvanically isolated field Inputs and four independent change over potential free Relay Outputs.



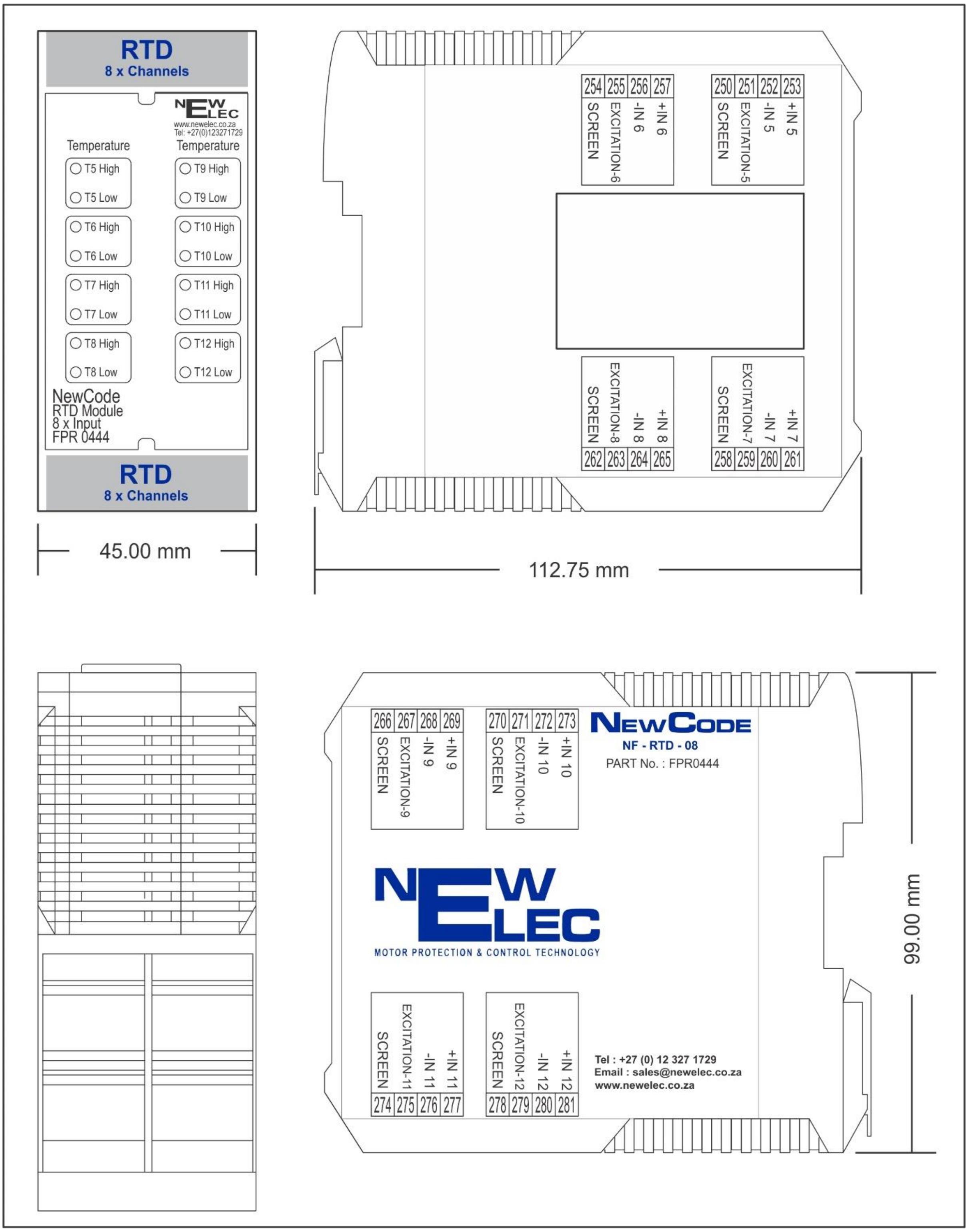
4.3 FPR1429 - RTD 04 temperature sensing module

FPR1429, RTD 04 : Temperature sensing module with four independent configurable sensor inputs as PT100, PT1000,PTC and 2,5 Kilo ohm NTC sensors, each sensor with settable Low-low (trip), Low(alarm), High (alarm) and High-high (trip) activation levels with respective flags to be used in configuration logic or activation of trip levels.



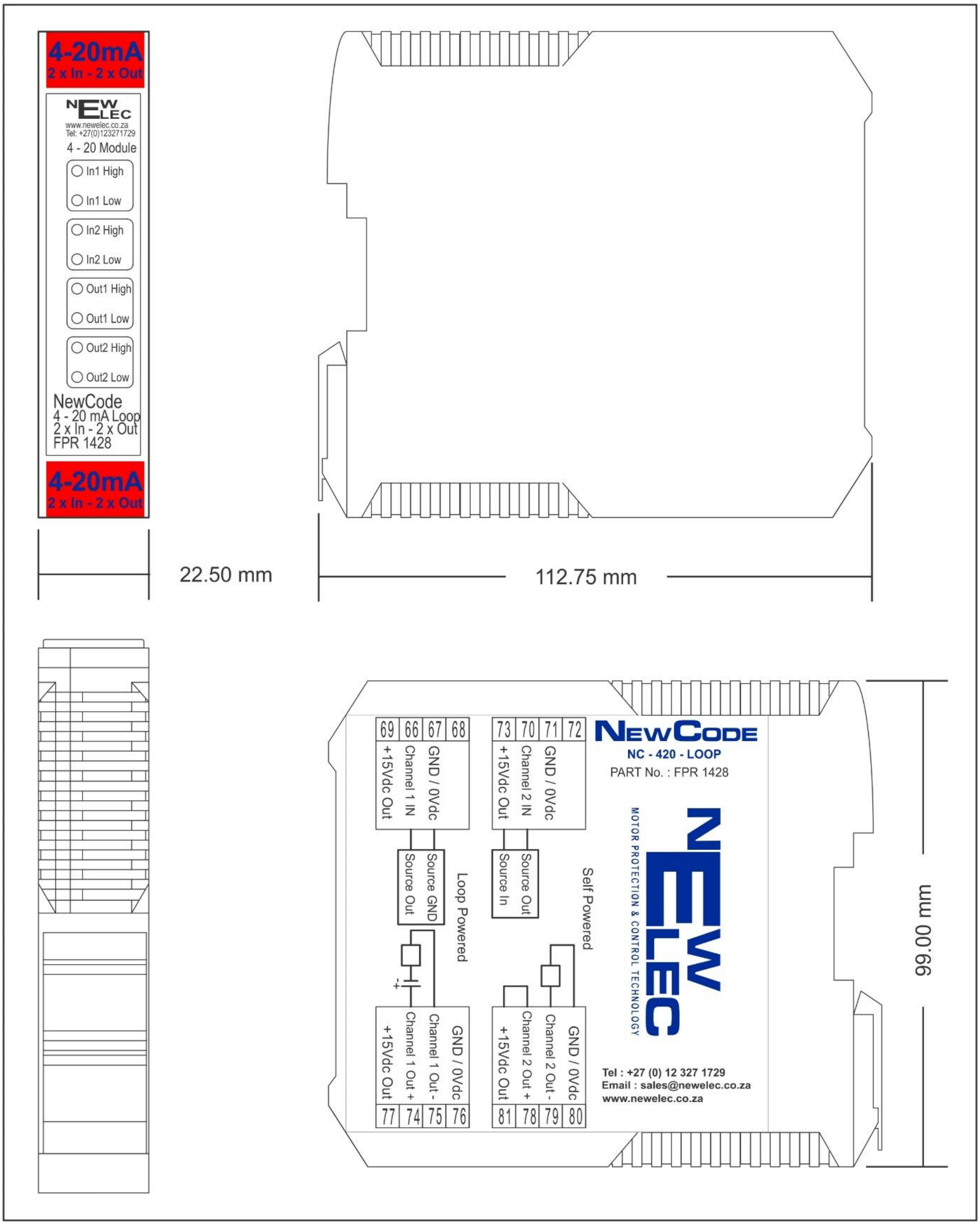
4.4 FPR0444 - RTD 08 temperature sensing module

FPR0444, RTD 08 : Temperature sensing module with eight independent configurable sensor inputs as PT100, PT1000,PTC and 2,5 Kilo ohm NTC sensors, each sensor with settable Low-low (trip), Low(alarm), High (alarm) and High-high (trip) activation levels with respective flags to be used in configuration logic or activation of trip levels.



4.5 FPR1428 - 4 to 20 mA analogue module (2x Input loops, 2x Output loops)

FPR1428, 4-20 mA : Dual input, output 4 to 20 mA or 0 to 20 mA analogue modules inputs and outputs configurable to selectable actual values within NewFeed or receive PLC set point ,each analogue sensing module has a settable Low-low (trip), Low(alarm), High (alarm) and High-high (trip) activation levels with respective flags to be used in configuration logic or activation of trip levels.



4.6 FPR0407 - External memory module

FPR0407, External memory configuration module provides non-volatile storage of complete NewFeed relay configuration with all set points, control logic and communication settings such as protocol address, baud rate etc.

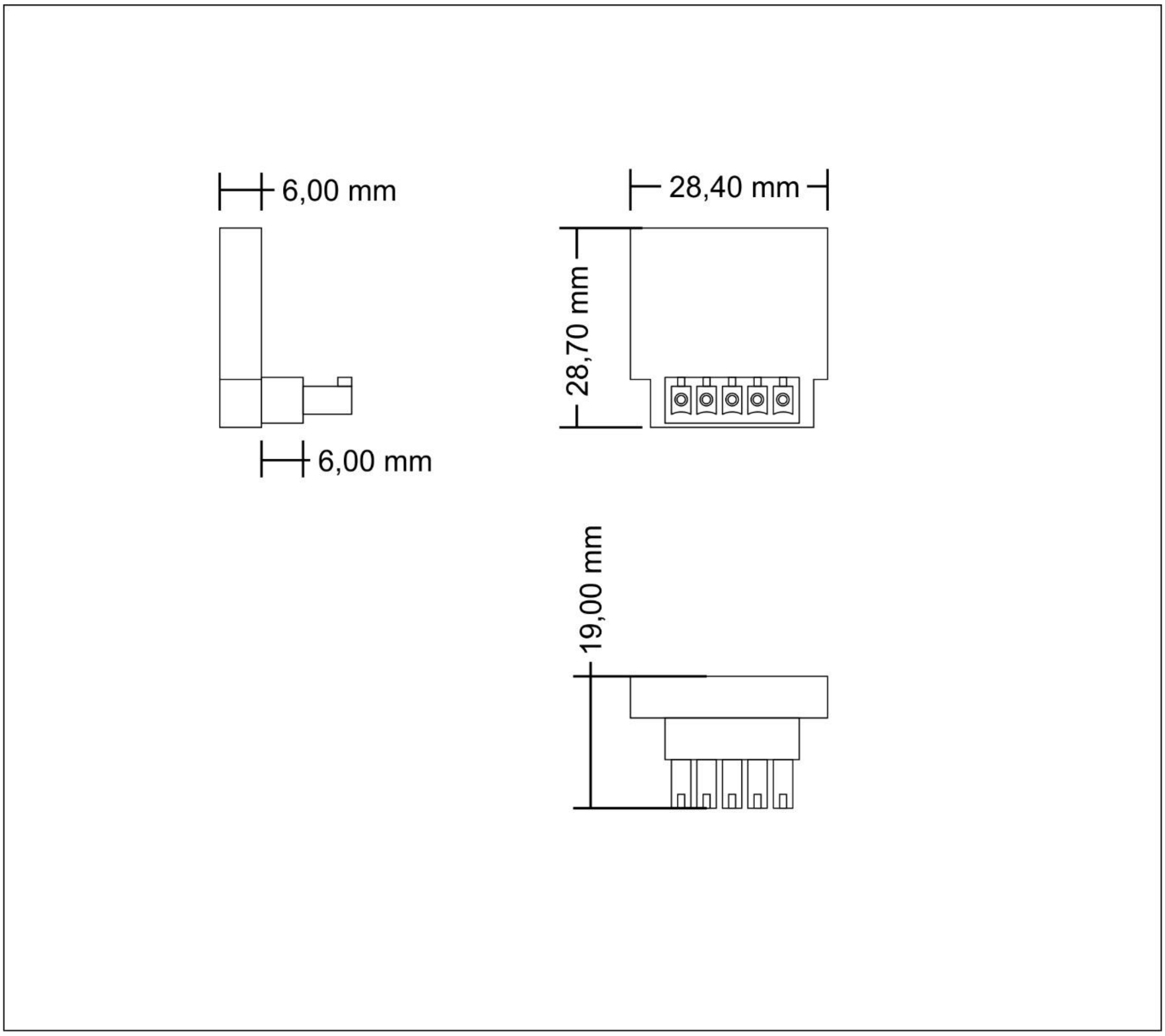
The memory module can be used to WRITE existing NewFeed configurations into a replacement relay, with two options – write from Memory module to NewFeed relay

1. Write all settings into NewFeed relay from memory module
2. Write only the settings and control logic DO NOT overwrite the communication configuration settings

Additionally

Memory module can be used to READ the NewFeed settings into a blank memory module,

These features allow maintenance staff to restore the NewFeed IED back to service without having to use the NewFeed configuration software with laptop.



4.7 FPR0408, FPR0409, FPR0410 - CTMB connection cable

The current and voltage sensing module can be installed conveniently in the main circuit and the 10-way ribbon cable with a common mode choke can be used to complete the CTMB connection to the NewFeed relay itself.

FPR0408, 1-meter CTMB connection cable,

FPR0409, 500 mm CTMB connection cable,

FPR0410, 300mm CTMB connection cable.

4.8 Low voltage 550 volt CTMB module 13 mm CT ID.

FPR0403, NC-01-110/550 (0.1 – 1 Amp full load, 110 – 550 VAC)

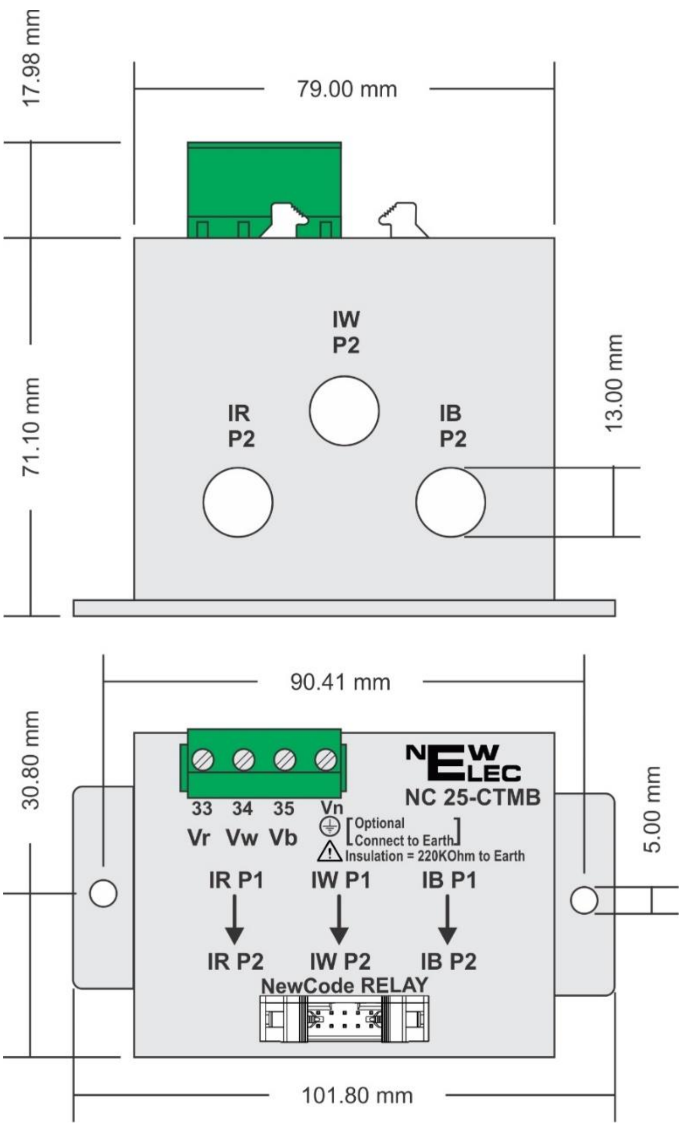
FPR0404, NC-05-110/550 (0.5 – 5 Amp full load, 110 – 550 VAC)

FPR0402, NC-10-110/550 (1 – 10 Amp full load, 110 – 550 VAC)

FPR0405, NC-25-110/550 (2.5 – 25 Amp full load, 110 – 550 VAC)

FPR0406, NC-50-110/550 (5 – 50 Amp full load, 110 – 550 VAC)

Designed to allow CTMB to be connected directly into the main circuit (V line 660 Volts isolation). Up to 550 volt the CTMB is available in a 1, 5, 10, 25 and 50 Amperage modules. The 1amp and 5 amp modules can be used with primary or interposing current transformers to allow for protection of larger machines, transformers or feeder panels.



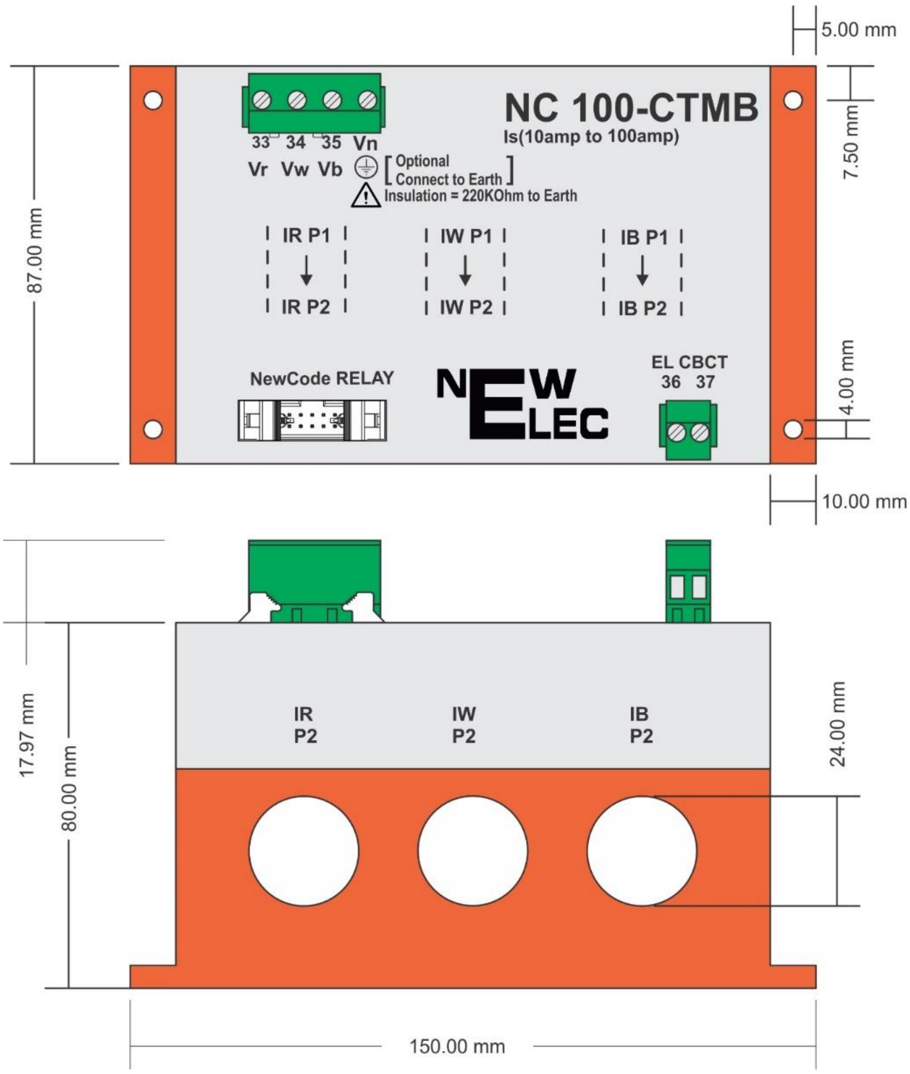
4.9 Low voltage CTMB module 24 mm CT ID.

FPR0402, NC-100-110/550 (10 – 100 Amp full load, 110 – 550 VAC, with CBCT)

FPR0401, NC-300-110/550 (30 – 300 Amp full load, 110 – 550 VAC, with CBCT)

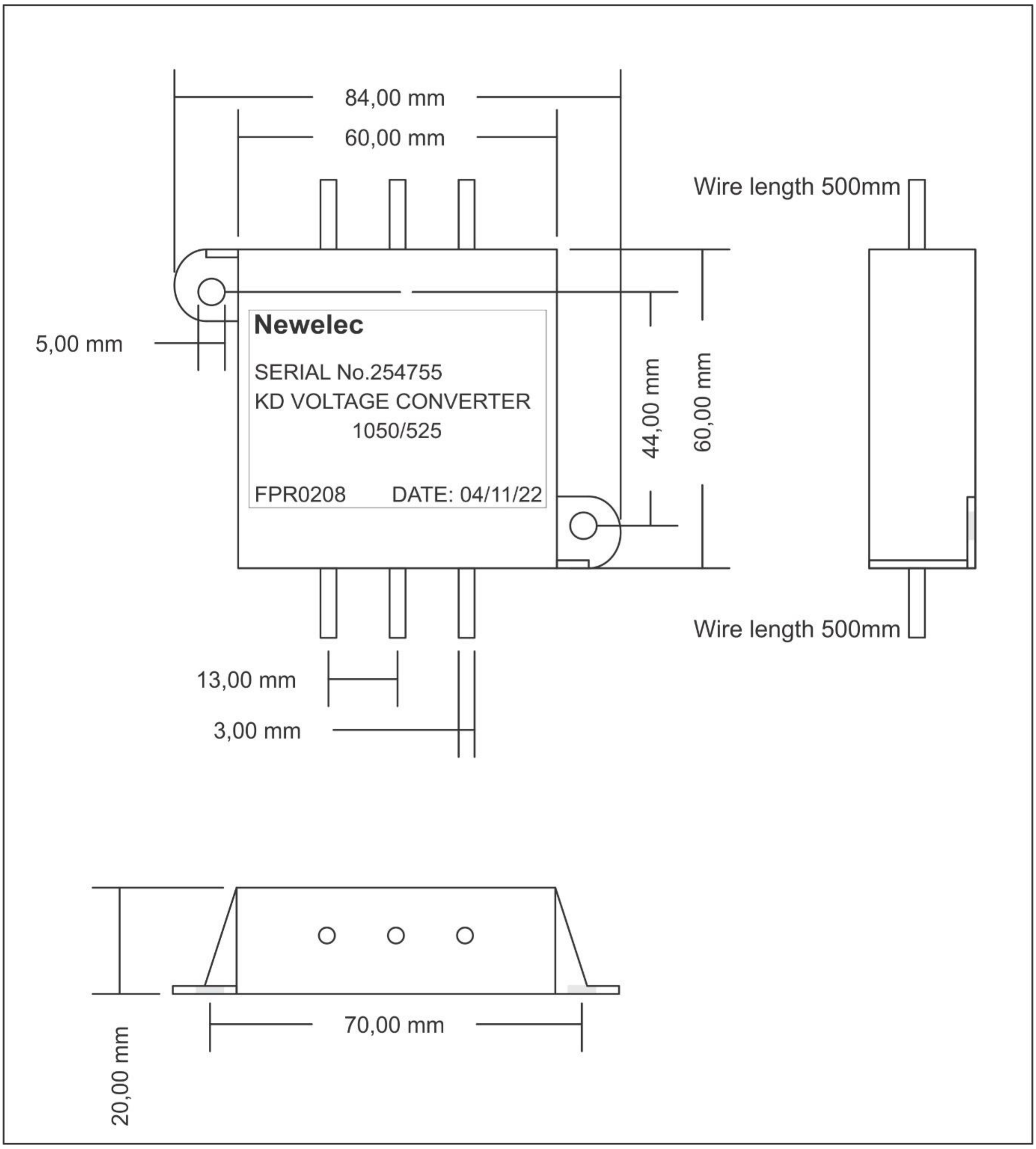
FPR0977, NC-400-110/550 (40 – 400 Amp full load, 110 – 550 VAC, with CBCT)

Designed to allow CTMB to be connected directly into the main circuit (V line 660 Volts isolation). Up to 550 volt the CTMB is available in a 100, 300 and 400 Amperage modules. The internal CBCT can be connected to the earth leakage terminals of the NewFeed. Eliminating the use of an external CBCT.



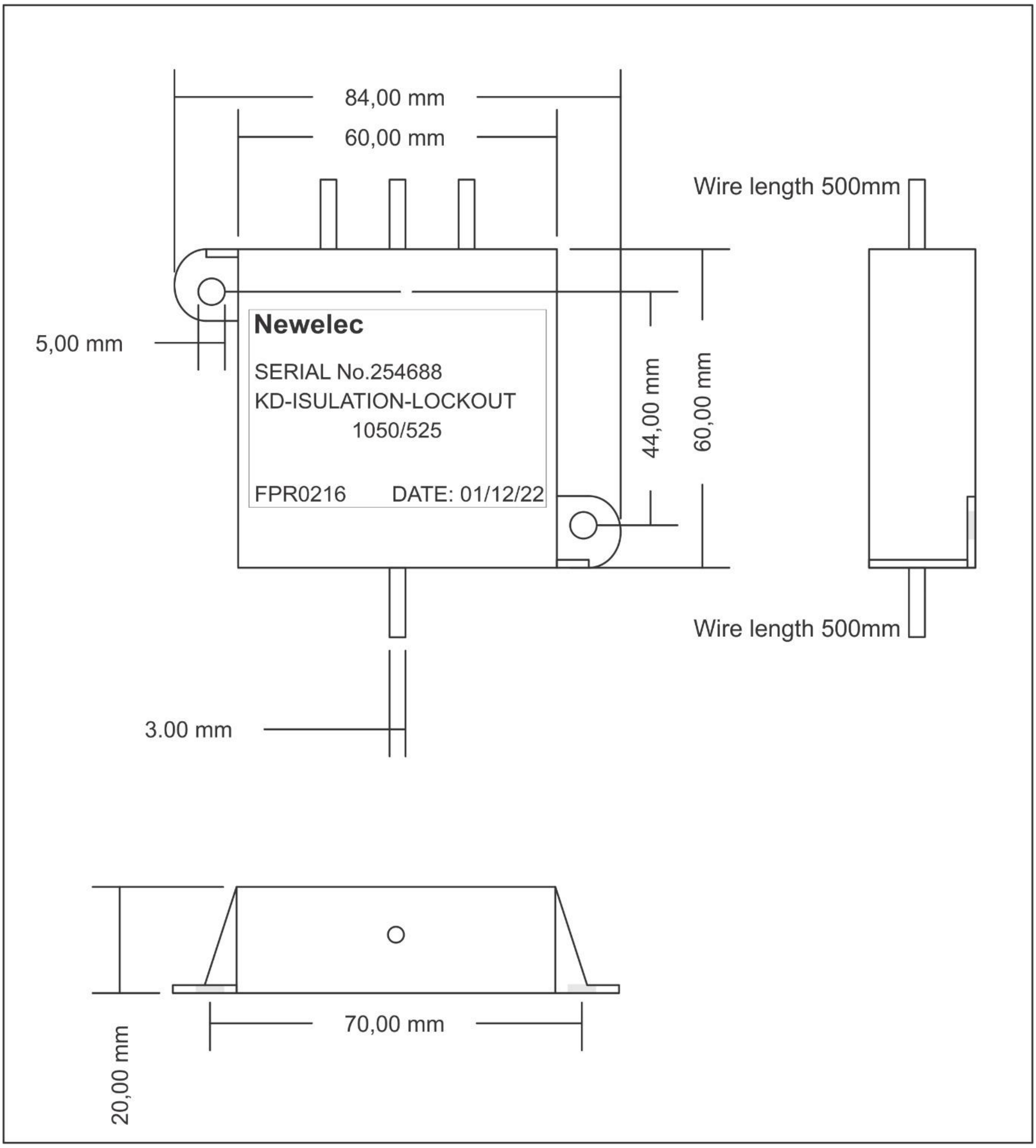
4.10 FPR0208 - Voltage converter module

FPR0208 is an external, 3 phase line voltage resistor divider converter used to connect directly with fly leads to 1050 VAC and using a 2:1 voltage divider circuit to reduce voltage 1050 to 525 Vac on the CTMB voltage measurement terminals.



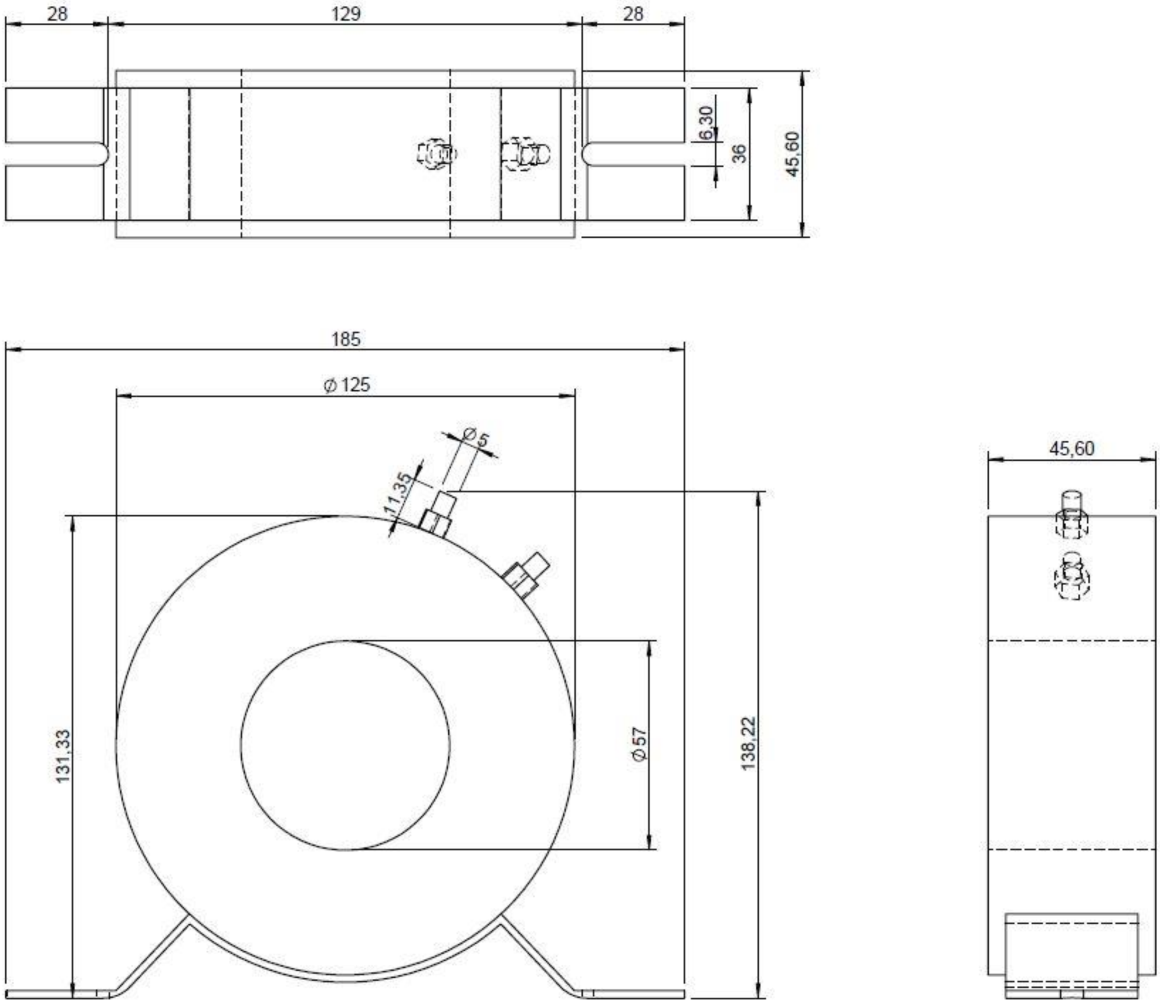
4.11 FPR0216 – Insulation lockout module

FPR0216 Insulation lockout used to measured resistance to earth on the load side of the contactor circuit with ANSI 64 function prevent the closure of main contactor onto an earth fault (resistance <20 kilo ohm to earth).



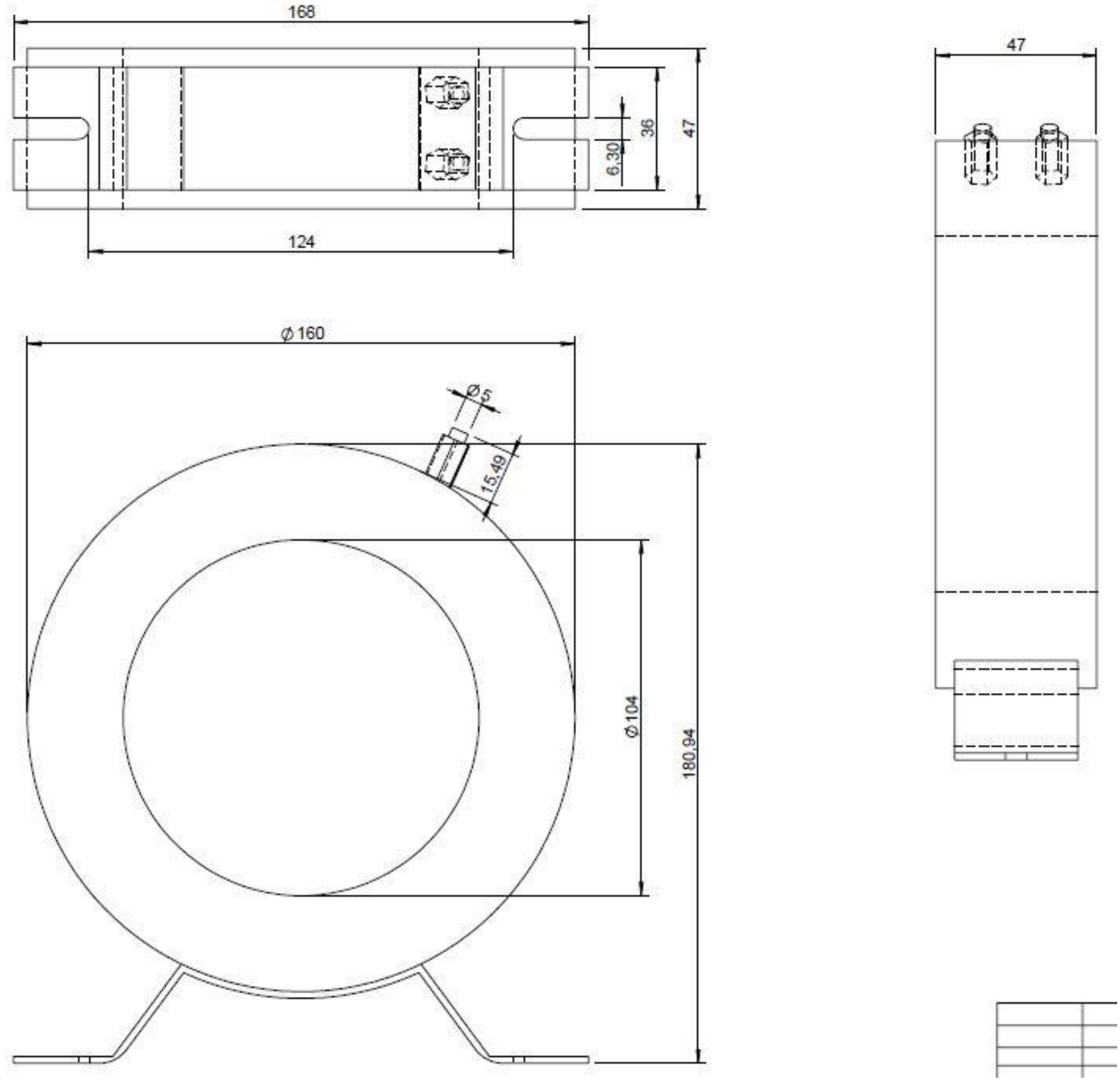
4.12 BTX0001 – CBCT circular 63 mm ID

BTX0001 CBCT circular core. (Dimension unit in mm)



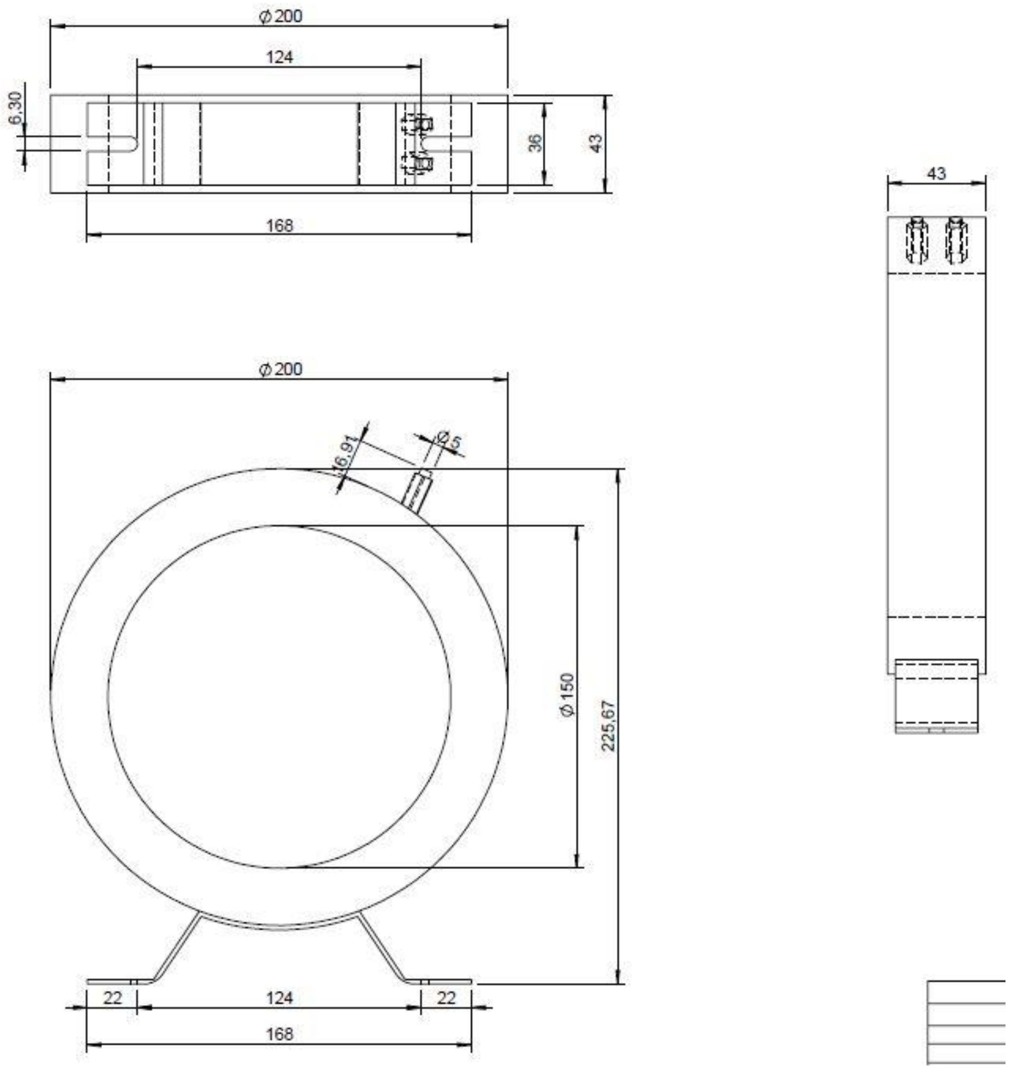
4.13 BTX0002 – CBCT circular 104 mm ID

BTX0002 CBCT circular core. (Dimension unit in mm)



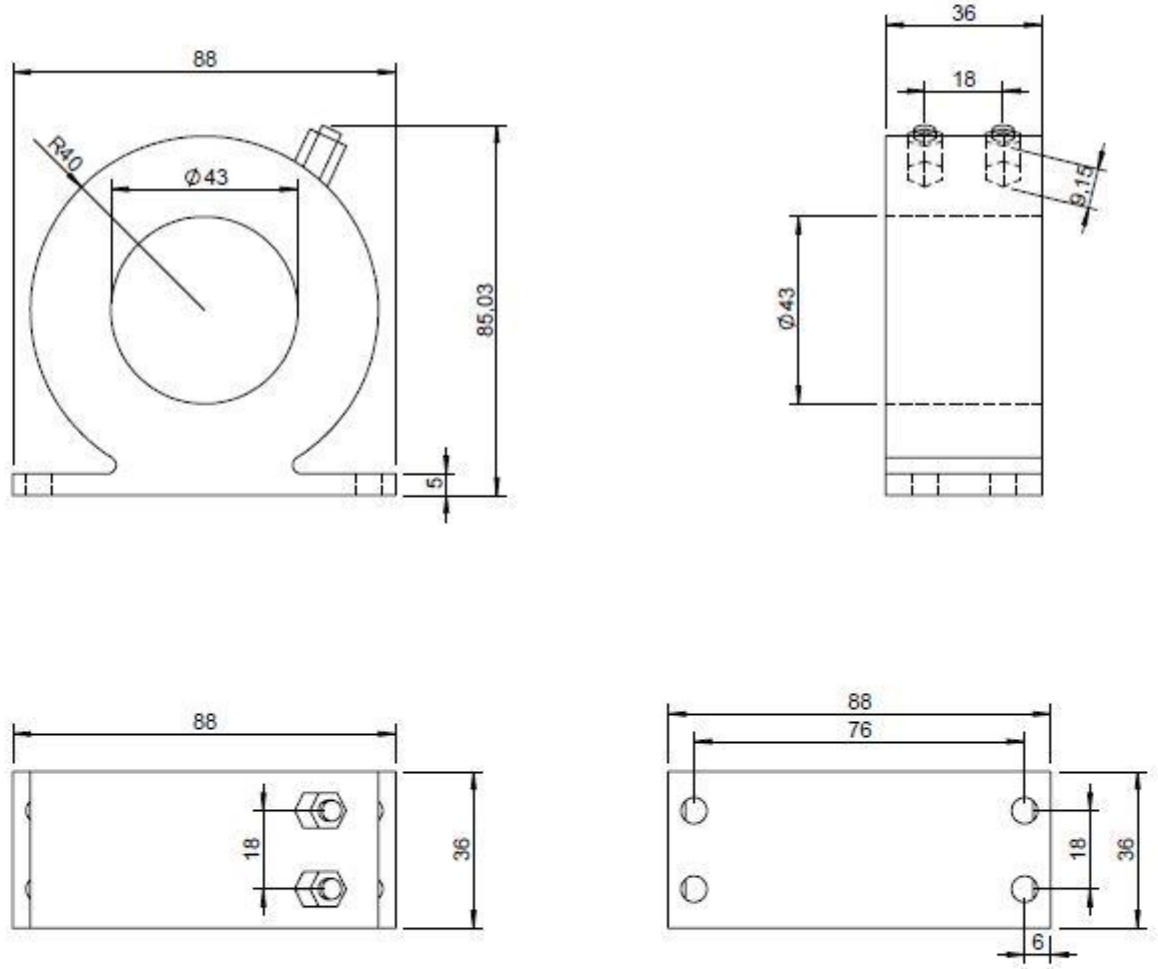
4.14 BTX0003 – CBCT circular 150 mm ID

BTX0003 CBCT circular core. (Dimension unit in mm)



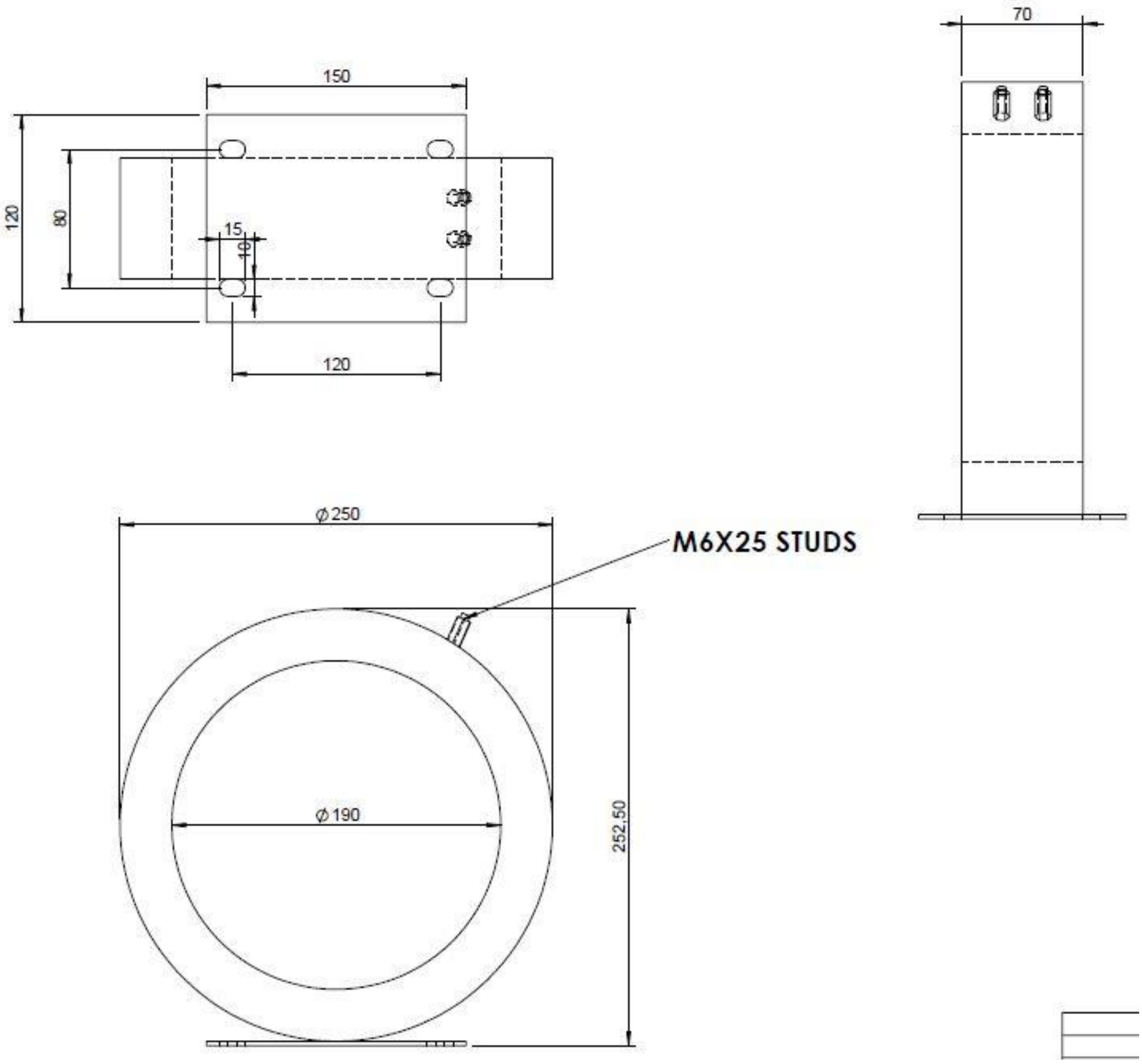
4.15 BTX0004 – CBCT circular 43 mm ID

BTX0004 CBCT circular core. (Dimension unit in mm)



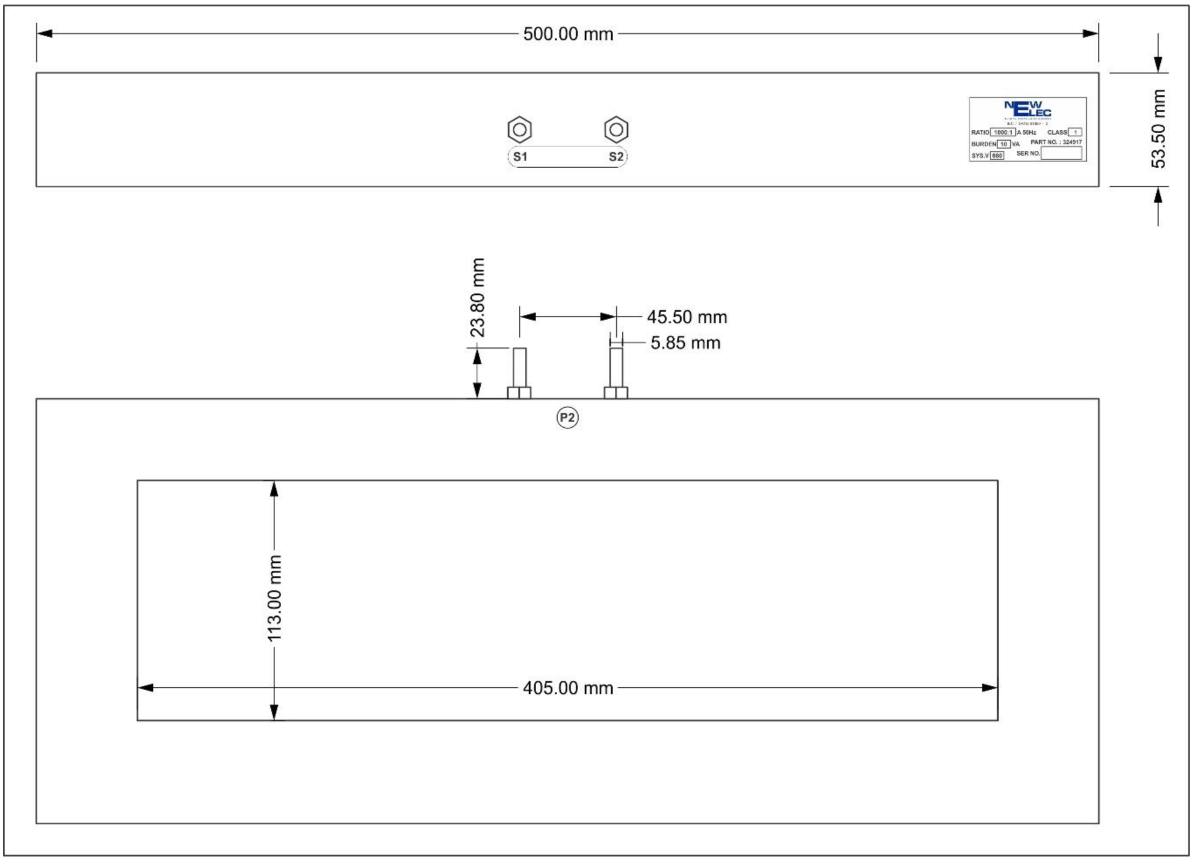
4.16 BTX0005 – CBCT circular 190 mm ID

BTX0005 CBCT circular core. (Dimension unit in mm)



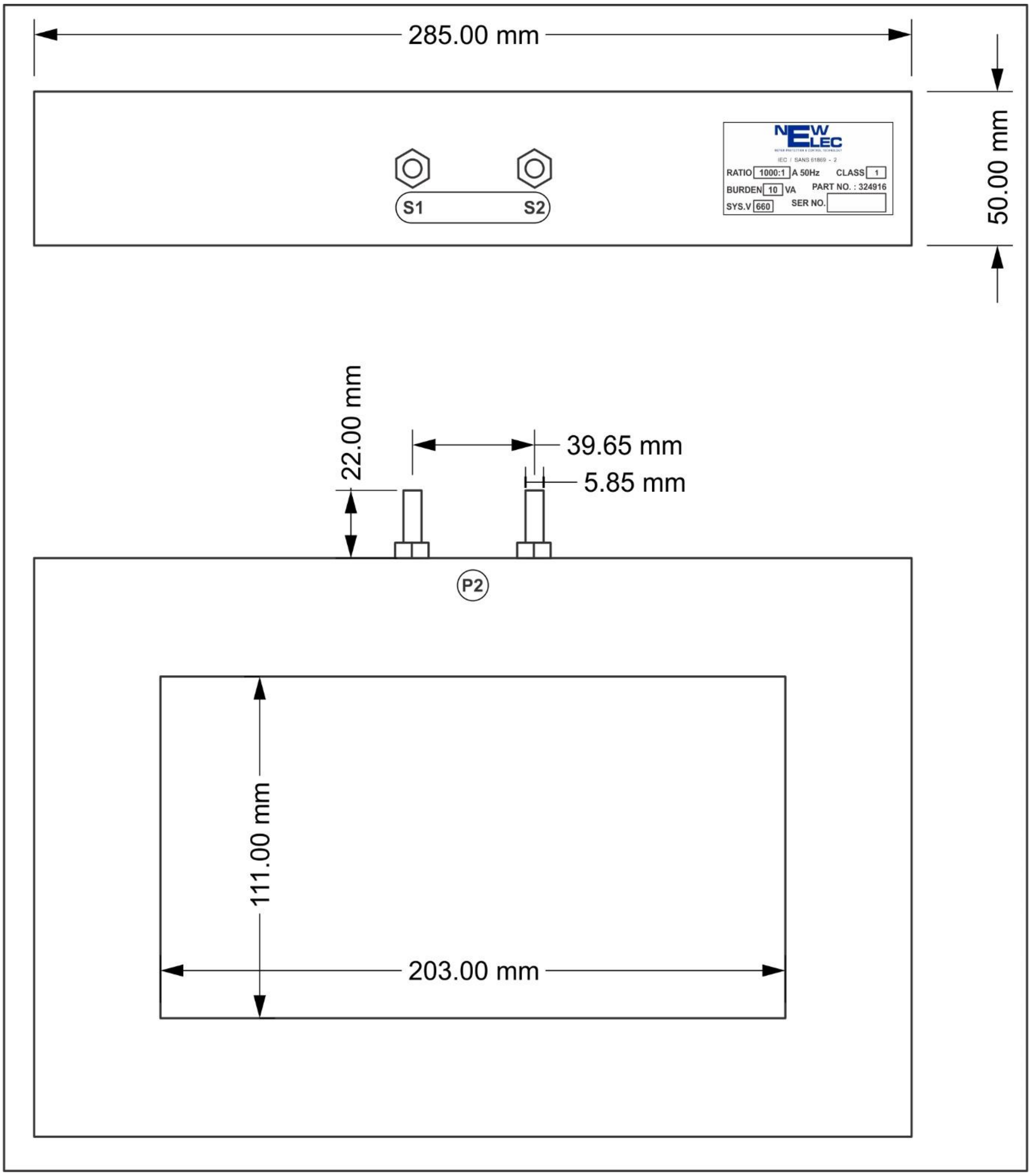
4.17 BTX0006 – CBCT rectangular 400mm ID

BTX0006 CBCT rectangular core.



4.18 BTX0007 – CBCT rectangular 200mm ID

BTX0007 CBCT rectangular core.



5 INSTALLATION

5.1 Guidelines for the safety of the user and of the NewFeed relay

This manual provides information for the use of the NewFeed relay. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows:

a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfil that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.

b) Any commissioning, plant or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfil that job. These engineers should also be trained in the use and maintenance of the relay and all modules associated with the relay. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.

c) All operators of the NewFeed relay and associated modules should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which relates to the actual operation of the relay and associated modules.

Note: The term “modules” refers to all additional plug in modules added to the relay with the aid of the Phoenix contact T-Bus DIN rail connector, as described in this manual.

Notes on the Symbols used in this Manual

At various times throughout this manual certain symbol will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware Warnings

1) Indicates that the identified danger **WILL** cause physical and property damage.

2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.

STOP 3) Indicates a point of further interest or further explanation.

Software Warnings

4) Indicates special care must be taken when using this element of software.

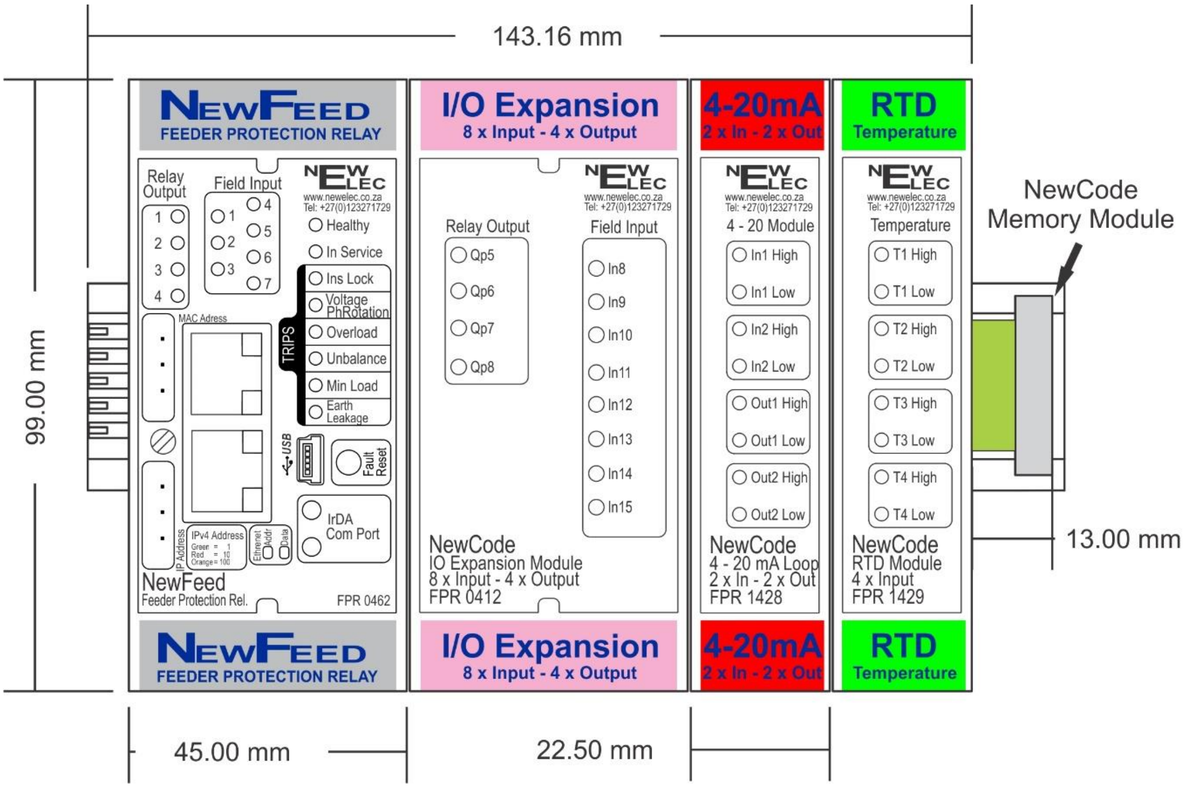
5) Indicates a special point which the user of the associate software element should be aware of.

6) Indicates a point of interest or further explanation.

5.2 NewFeed relay and module mounting

Install the NewFeed relay in an environment conforming to the generic specifications for installation precautions.

A complete modular system (Protection relay (IED) with DIO expansion, 4-20mA, I/O and 4 Channel RTD modules) is as shown below.



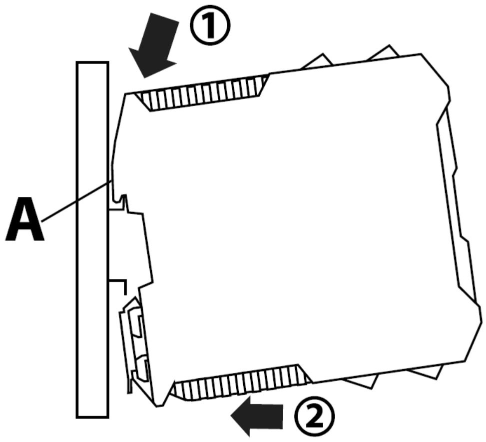
All expansion modules are powered and communicate with the NewFeed relay via a T-Bus connector (Phoenix Contact Part Number 2713722), a 5 pole DIN rail mounted expansion plug and socket assembly.

Therefore, the interconnecting T-Bus running on the back of the 35 mm DIN rail must always be extended accordingly to reach all modules.

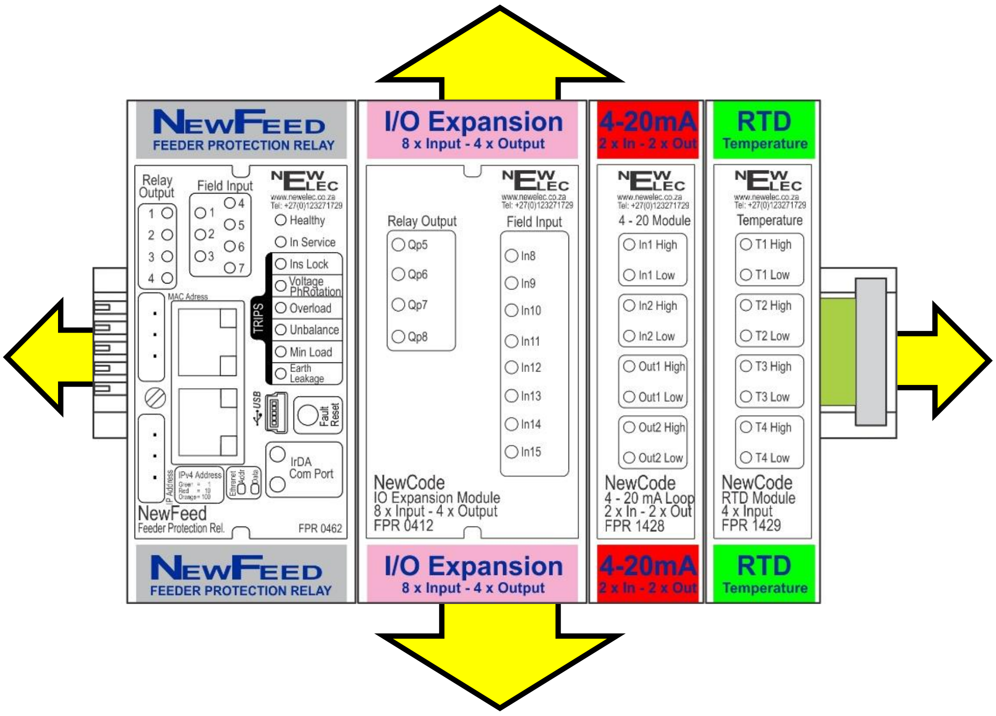
NewFeed Relay and all other expansion modules – can only be mounted on 35mm DIN Rail (DIN46227), as depicted in the picture below.

1) Push down the top part (point 1) of the module (NewFeed relay or CT block any expansion module) onto upper edge of the DIN rail mounting groove as shown by position “A”.

2) Then directly push into the DIN rail as shown by point 2.



The NewFeed (and specified expansion modules) must be installed with a free space of about 30 mm on all four sides, and the DIN rail locked on both ends to minimize unwanted movements and vibrations.



6 Wiring

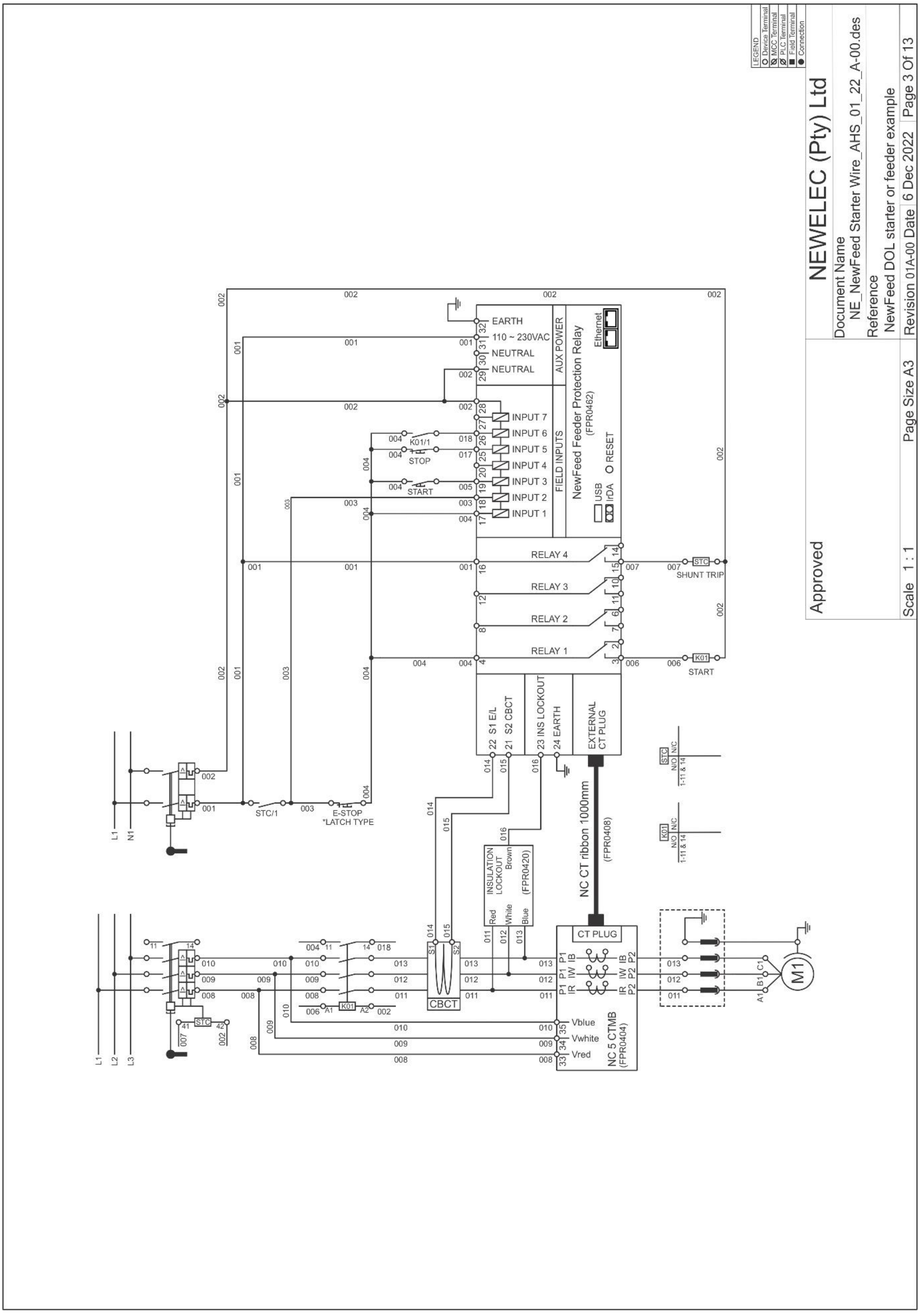
6.1 Power supply wiring

The NewFeed relay is powered from a universal switch mode power supply range from 84-264 VAC / VDC source. The terminal numbers for connecting power supply are

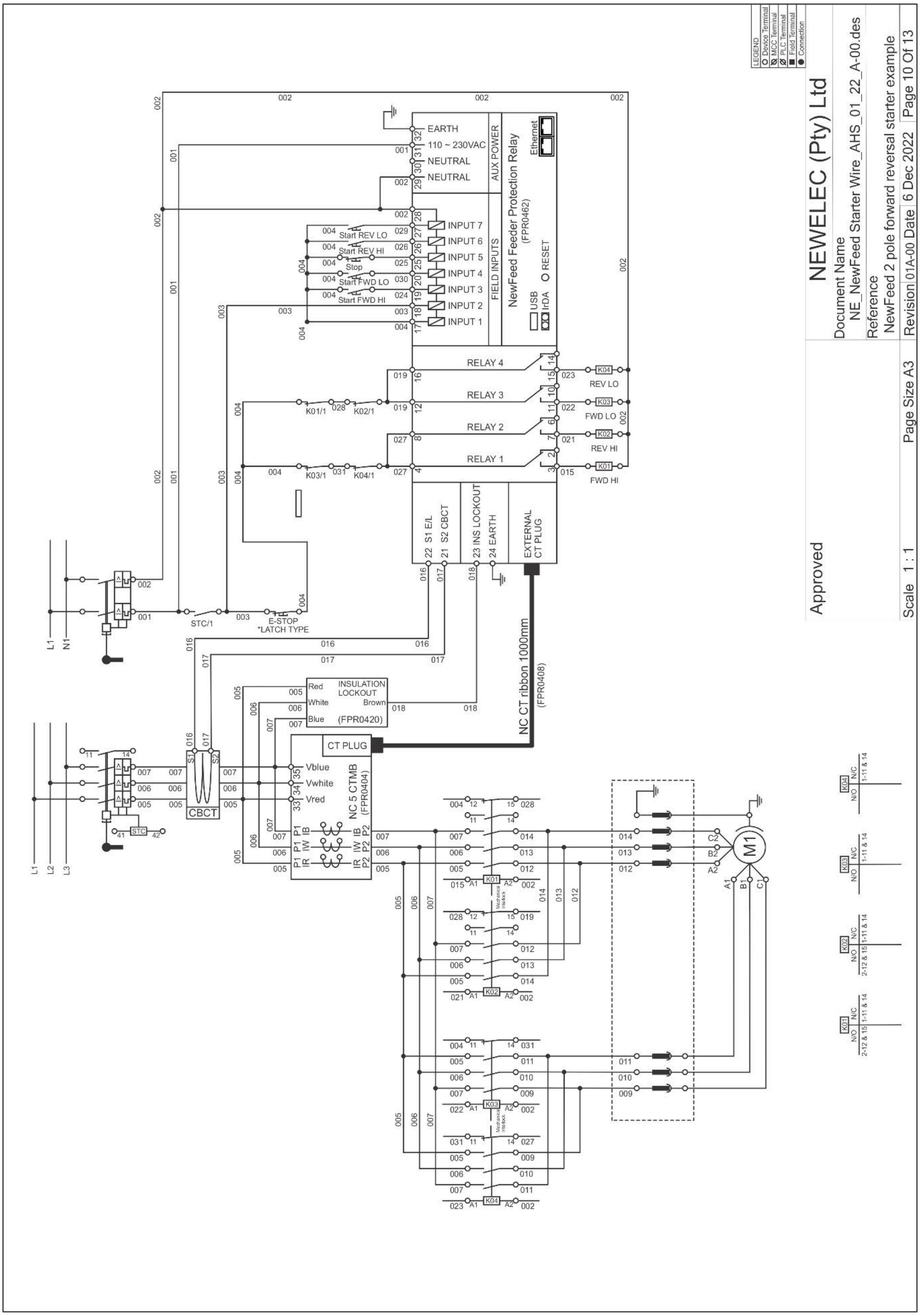
- Terminal 31 (Live VAC or Positive '+Ve' for VDC).
- Terminals 29 & 30 (Neutral VAC or Negative '-Ve' for VDC) [Bridged internally inside the NewFeed relay].
- Terminal 32 Earth or ground conductor.

  The Digital Field Inputs (DFIs) can be powered from a separate control supply or the auxiliary control supply used to power the control relays. If the same auxiliary supply is used to power various DFIs, the neutral of the auxiliary supply (terminal 29 or 30) should be connected to the Field input common (terminal 28).

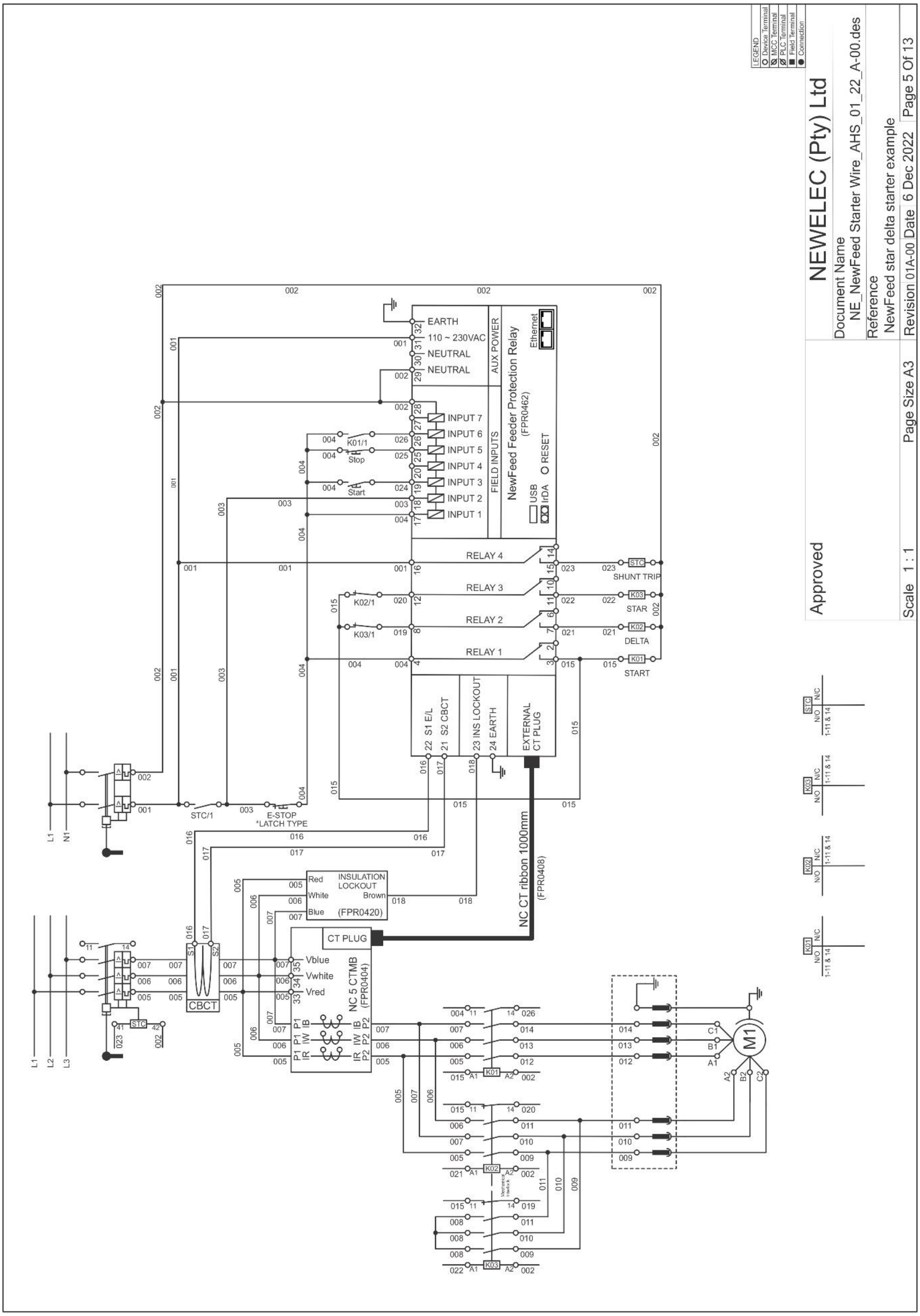
6.2 Schematic diagram DOL starter



6.3 Schematic diagram forward reverse starter

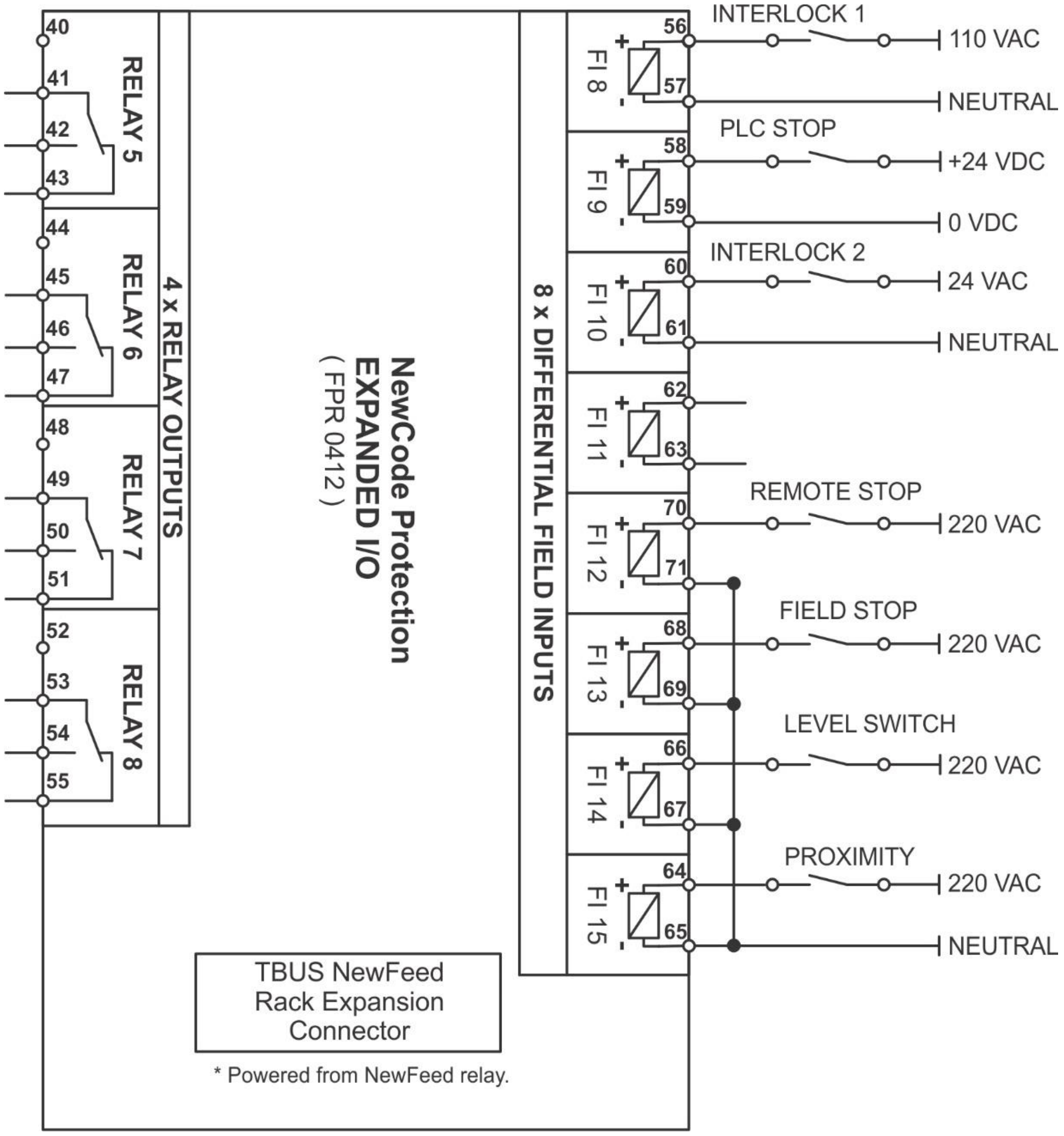


6.4 Schematic diagram Star Delta configuration



6.5 Digital IO expander module wiring

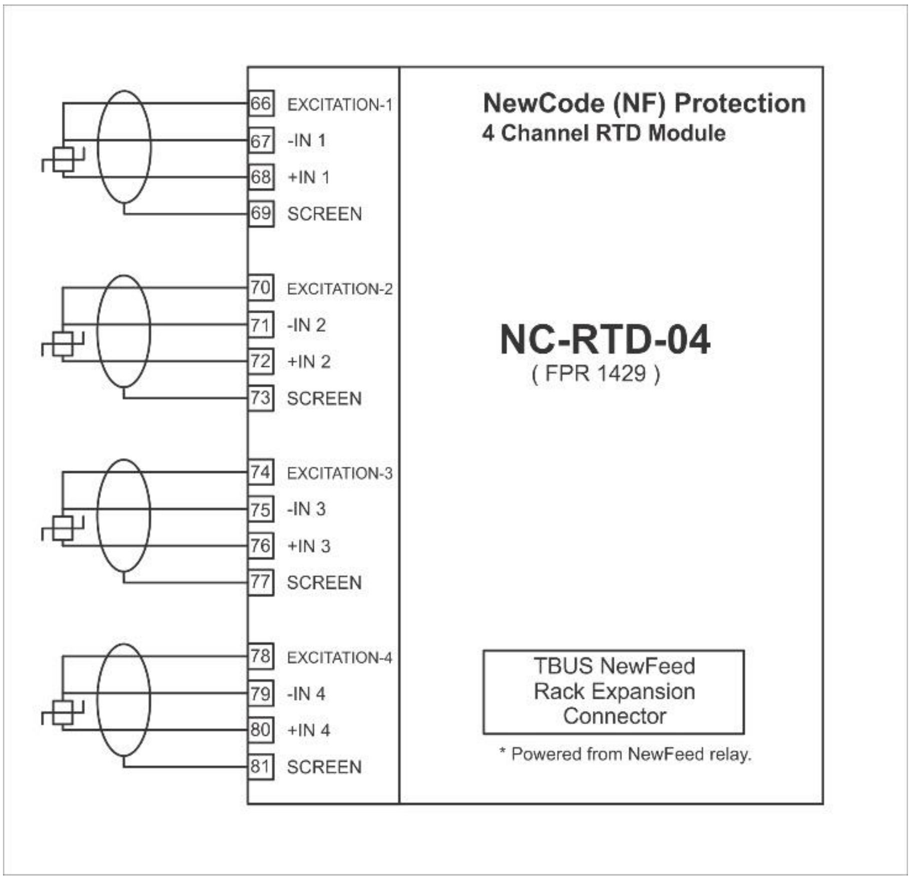
The external Digital Input / Output (DIO) module has eight galvanically isolated differential separate inputs that will operate on any voltage greater than 24 v ac-dc the maximum voltage has been set at 240 vac-dc. The 4 output relay contacts galvanically isolated form C or separate change-over contacts rate at 220 vac 5 amps.



6.6 RTD 04 and RTD 08 module wiring

The wiring below applies to a 3-wire temperature sensor. For a 2-wire sensor such as PTC or NTC, excitation pin must be shorted to the channel -IN pin or (101 to 102) or (105 to 106) or (109 to 110) or (113 to 114) respectively.

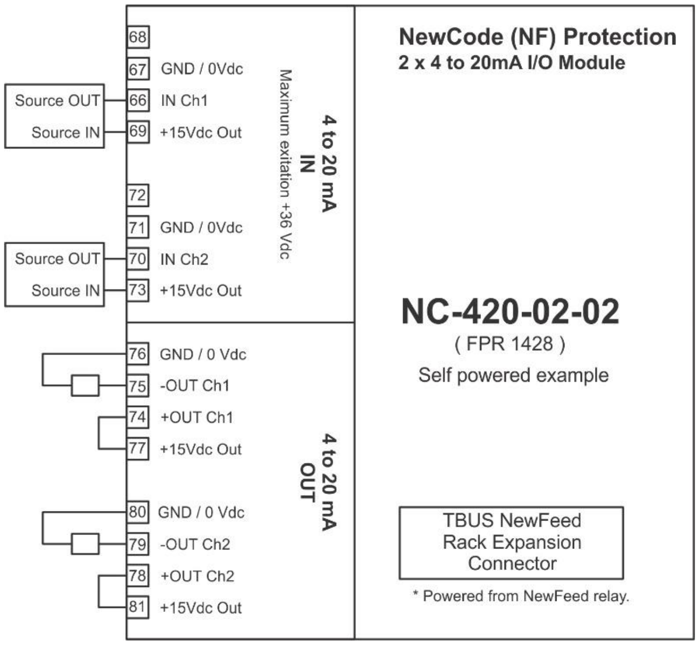
The individual channels can be configured to protect motor windings, preload thermal model with temperature, bearing temperature or thermostat over temperature protection.



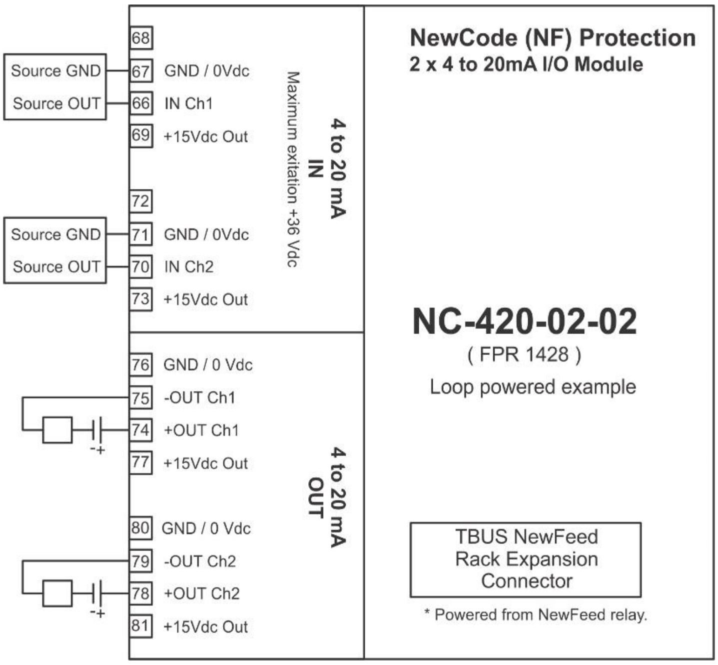
6.7 4 to 20 mA analogue module x 2 channels in and out wiring

Has 2 x input and 2 x output channels that can be configured self-powered or looped power.

For unit powered from NewFeed 4 to 20 milli amp module

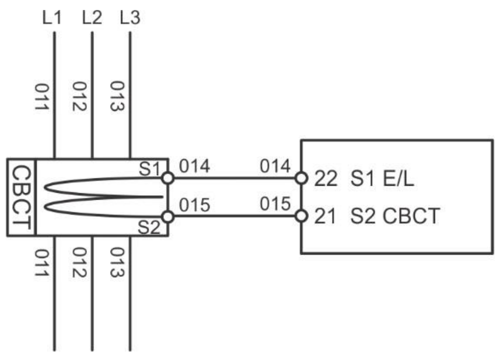


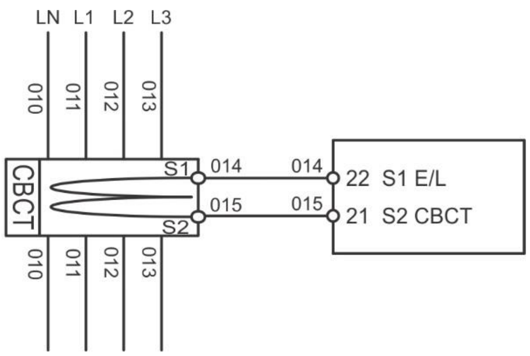
For a loop-powered unit, the wiring is shown below.



6.8 CBCT connections

Drawing shows how to handle a 3 wire and 4 wire systems.



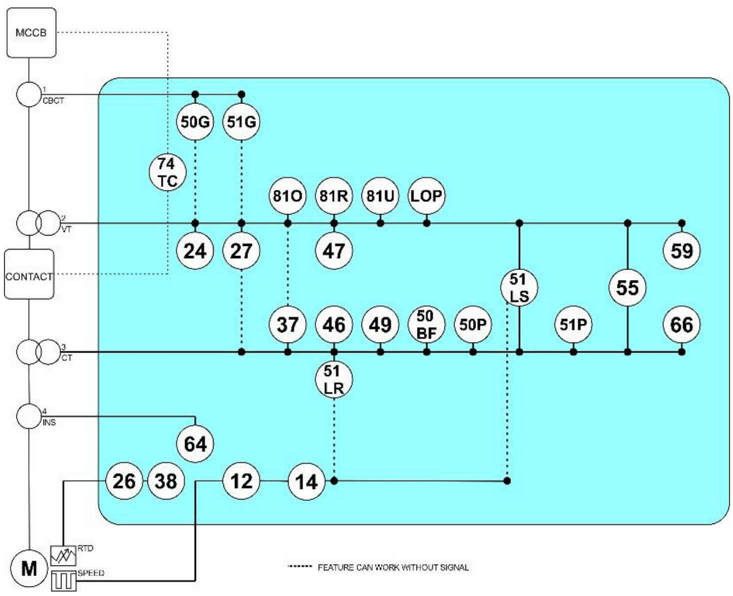


7 FEATURES

7.1 Protection ANSI code overview

The NewFeed Relay is an ISO 9001:2015 compliant.

- The NewFeed targeting motor and feeder protection in both the LV and MV environment multiple curve selections as well as positive, negative and zero sequence protection. All this ANSI codes shown on the diagram below are identified in ANSI codes Table, Appendix B.



7.2 Communication

The NewFeed offers a wide range of communication capability, including Modbus, Profibus, Modbus TCP, PROFINET.

Protocol	Physical layer
Profibus DPV1	RS-485
Modbus RTU	RS-485
Modbus TCP	Ethernet
PROFINET	Ethernet

8 QUICK FACTORY START

8.1 Connecting NewFeed configuration software and SCADA

The list below shows all the communication methods to connect to the NewFeed relay.

- Laptop connected through USB port for System Configuration,
- SCADA system connected through one of the internal communication modules.

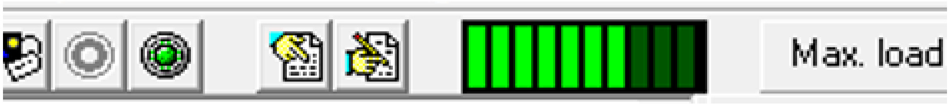
8.2 Starting NewFeed configuration software

On the main menu, under **Communication Setup** (red highlighted icon).

Choose the Comport in the drop down menu in the diagram below that is connected to the NewFeed relay. Click **OK**.

Then Click Connect ().

The green graph bars will start to run from Left to right.



Then the Electrical Designer / Maintenance personnel are free to program the relay as required.

If the bar does not run as indicated, then there could be a need to install USB-to-Mini USB drivers, so that NewFeed can communicate with a PC/Laptop.

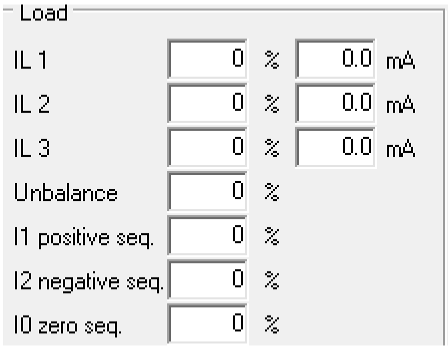
8.3 User function test

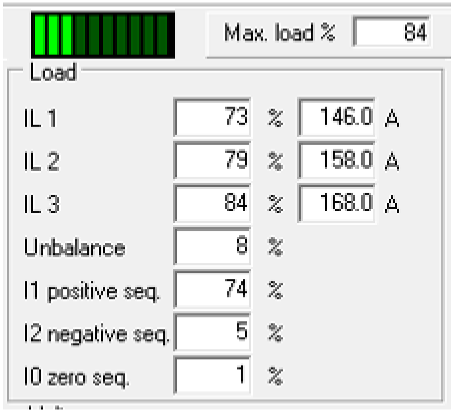
Normal operation at first power on:

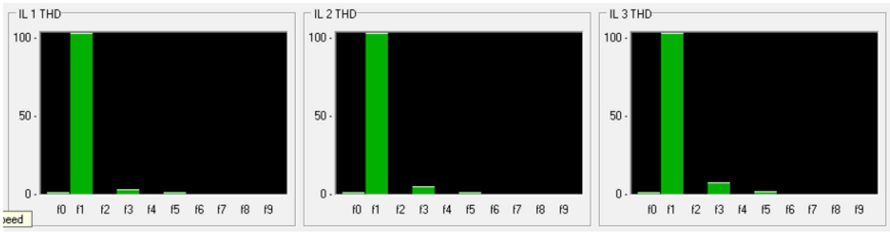
- All lights flash for internal system test, then
- All lights go off and only healthy lights stay on.
- Relay 1 indication switches "ON" if configured for "Fail-safe" and configured "Protection".
- If trip condition existed before auxiliary power switched off the
- Fault indication "LED" status will be restored.
- Requires "Reset" action from
    - control panel PUSH BUTTON or,
    - PLC reset configured reset or,
    - If the fault does not clear, then investigation is needed why the fault persists.
- If system configured with expansion module and expansion module has been removed will indicate system fault "Healthy LED" will pulse On, Off at a 1 second interval

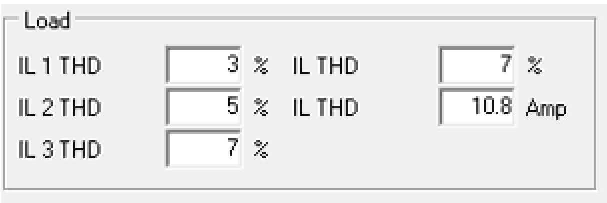
9 OPERATION FEATURES (MONITORING AND METERING)

9.1 Current (I1 positive, I2 negative, I0 zero, unbalance and THD)

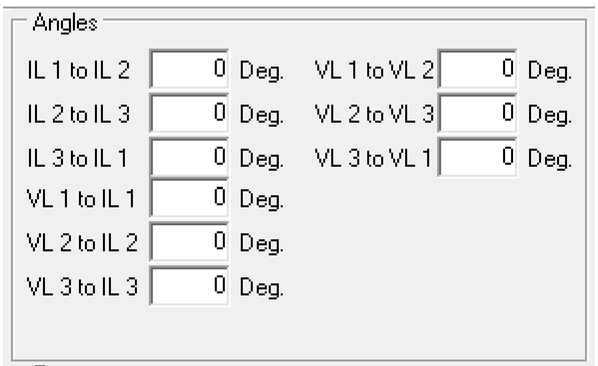


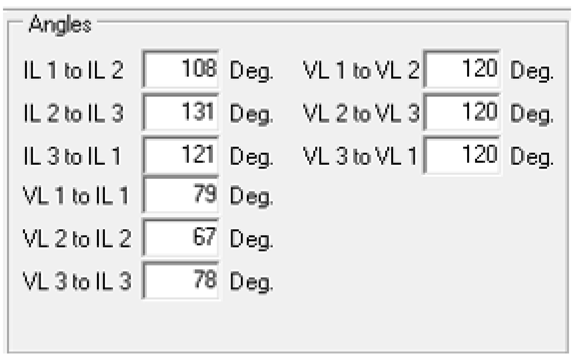




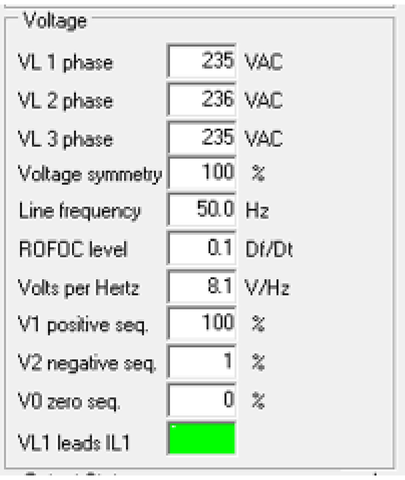


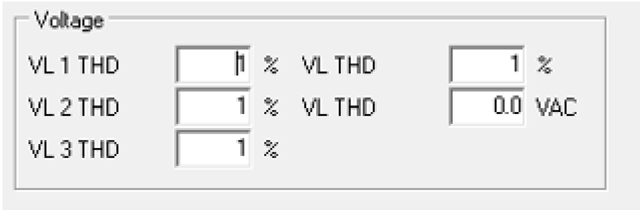
9.2 Phase angles

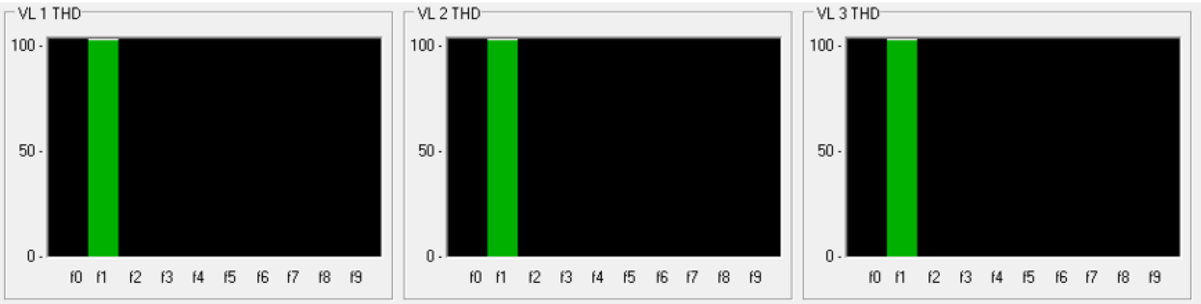




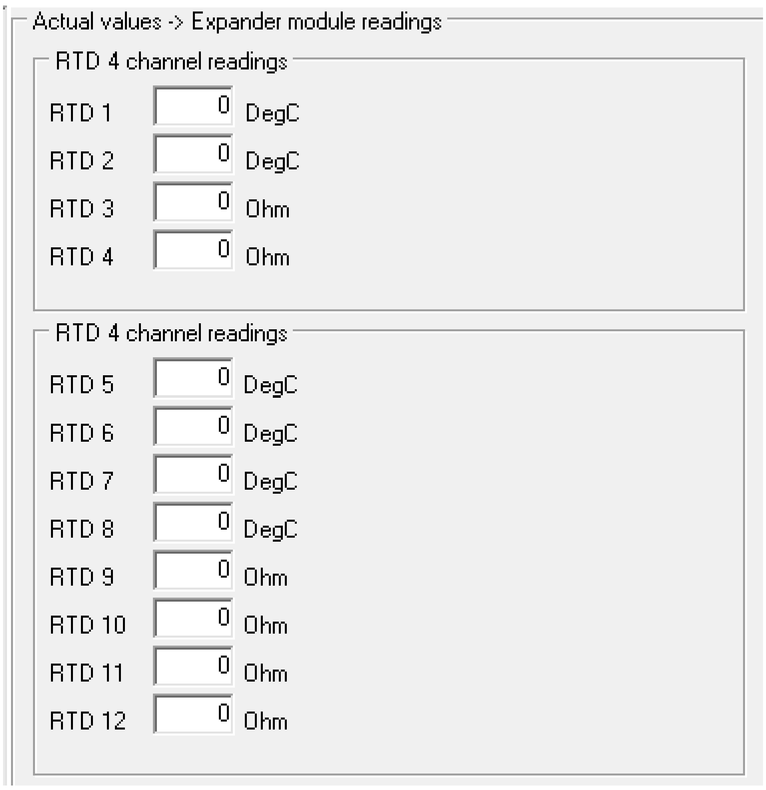
9.3 Voltage (I1 positive, I2 negative, I0 zero, symmetry, frequency and THD)



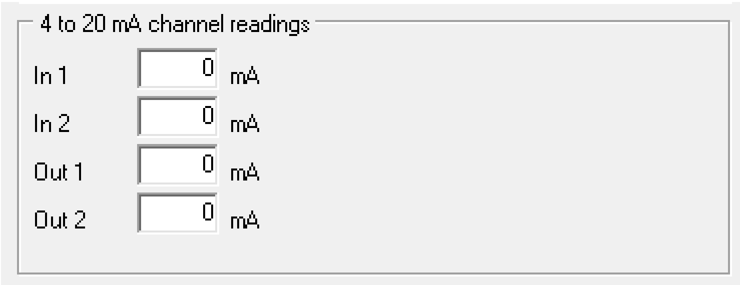




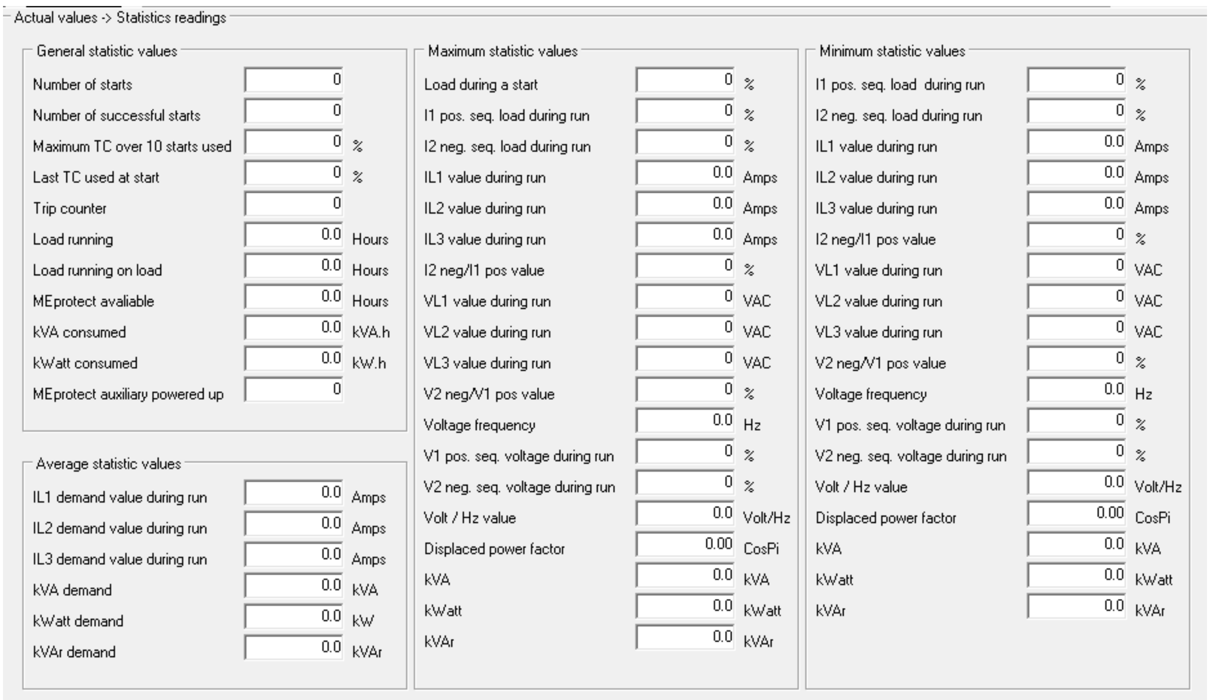
9.4 Temperature wit RTD modules



9.5 4 to 20 mA with analogue module



9.6 Statistical data

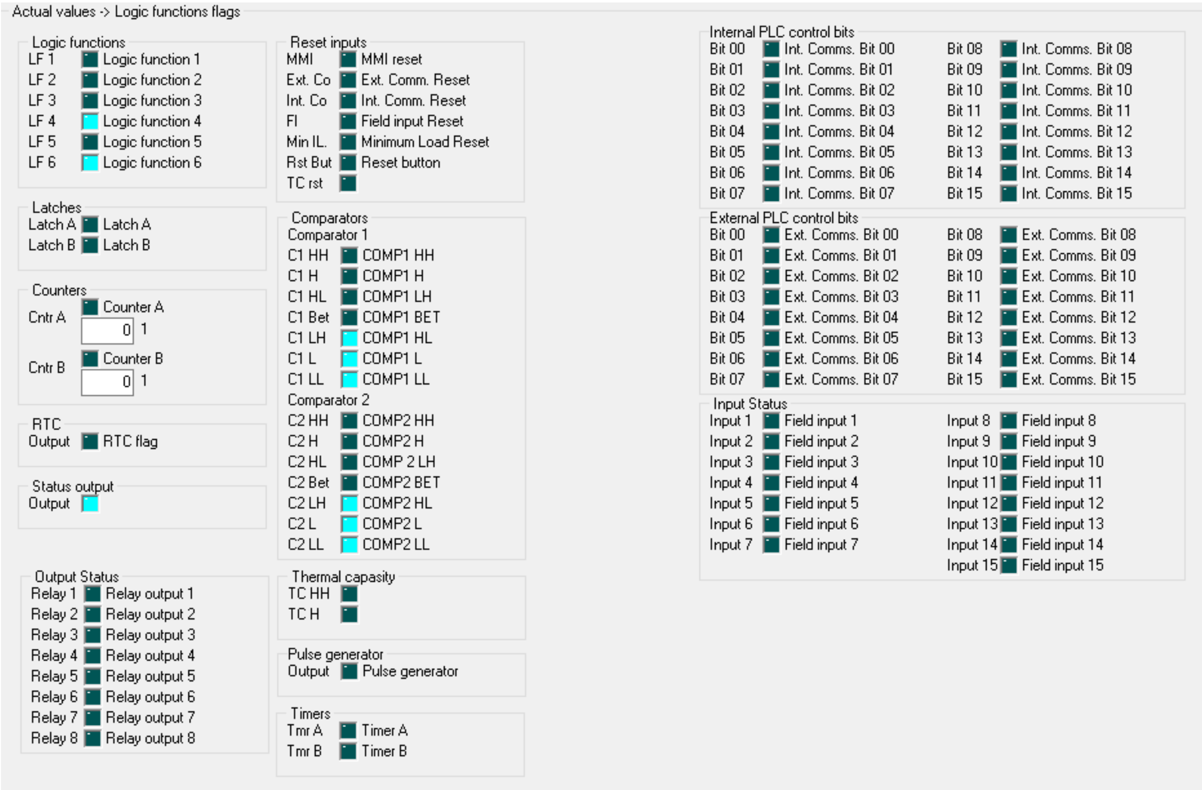


9.7 Warning, alarm and trip flags

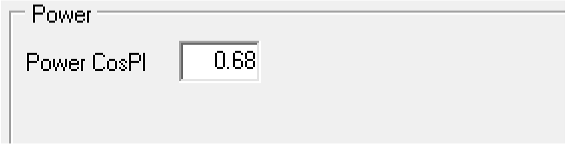
Indication definition:

- Blue = warning
- Amber = alarm
- Red = trip

9.8 Logic flag monitoring



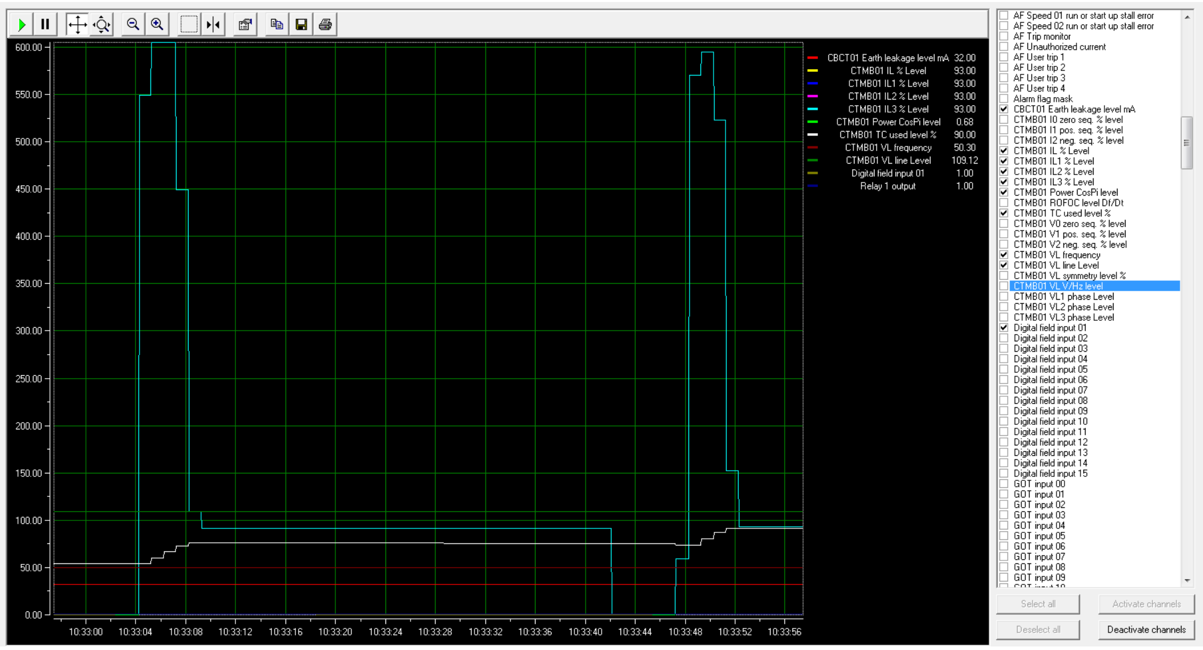
9.9 Power factor



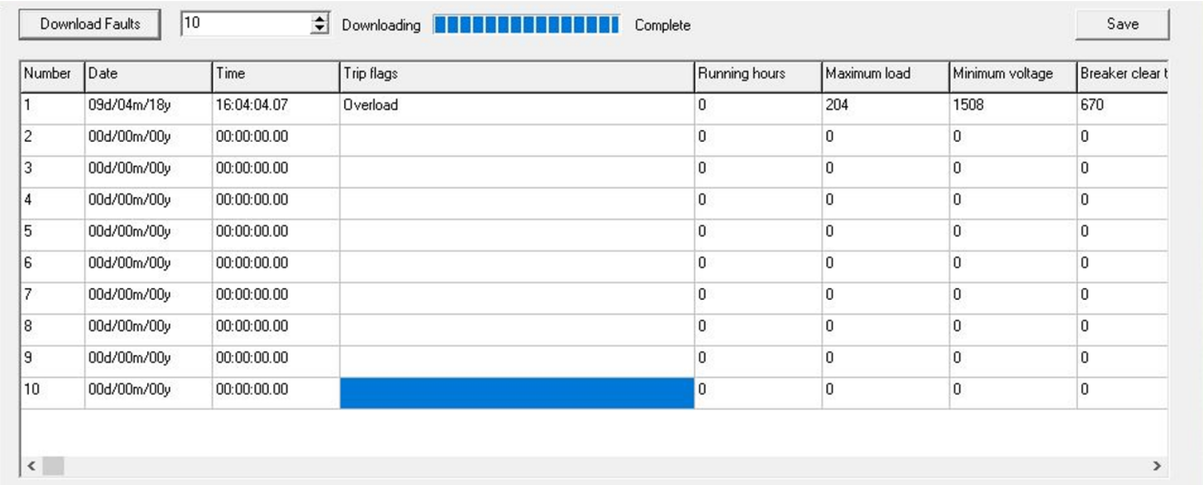
9.10 Earth leakage

9.11 Insulation

9.12 Recorder

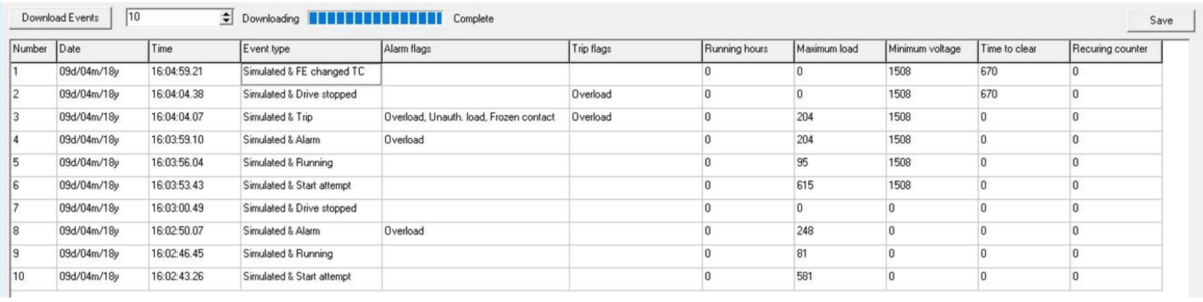


9.13 Fault record



Number	Date	Time	Trip flags	Running hours	Maximum load	Minimum voltage	Breaker clear t
1	09d/04m/18y	16:04:04.07	Overload	0	204	1508	670
2	00d/00m/00y	00:00:00.00		0	0	0	0
3	00d/00m/00y	00:00:00.00		0	0	0	0
4	00d/00m/00y	00:00:00.00		0	0	0	0
5	00d/00m/00y	00:00:00.00		0	0	0	0
6	00d/00m/00y	00:00:00.00		0	0	0	0
7	00d/00m/00y	00:00:00.00		0	0	0	0
8	00d/00m/00y	00:00:00.00		0	0	0	0
9	00d/00m/00y	00:00:00.00		0	0	0	0
10	00d/00m/00y	00:00:00.00		0	0	0	0

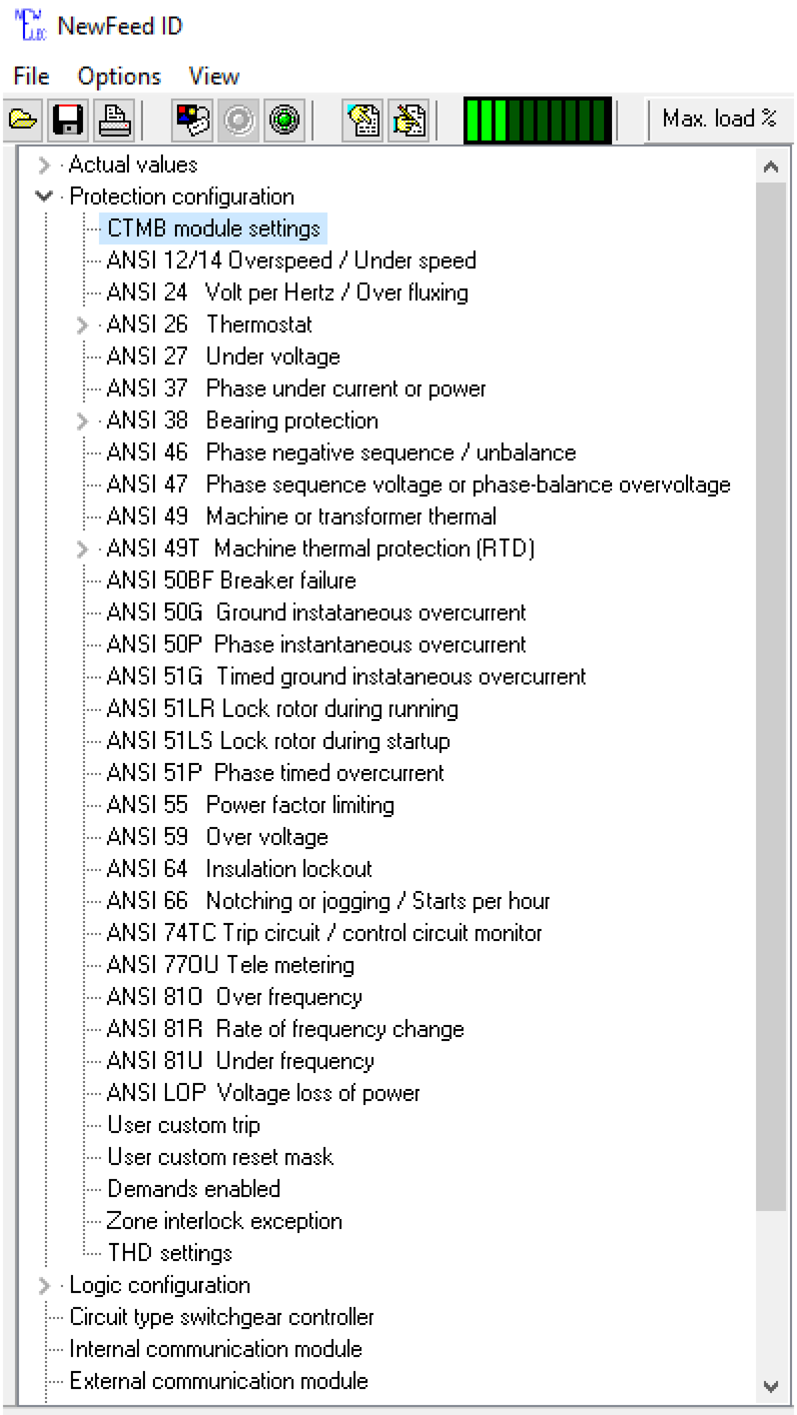
9.14 Events record



Number	Date	Time	Event type	Alarm flags	Trip flags	Running hours	Maximum load	Minimum voltage	Time to clear	Recuring counter
1	09d/04m/18y	16:04:59.21	Simulated & FE changed TC			0	0	1508	670	0
2	09d/04m/18y	16:04:04.38	Simulated & Drive stopped		Overload	0	0	1508	670	0
3	09d/04m/18y	16:04:04.07	Simulated & Trip	Overload, Unauth. load, Frozen contact	Overload	0	204	1508	0	0
4	09d/04m/18y	16:03:59.10	Simulated & Alarm	Overload		0	204	1508	0	0
5	09d/04m/18y	16:03:56.04	Simulated & Running			0	95	1508	0	0
6	09d/04m/18y	16:03:53.43	Simulated & Start attempt			0	615	1508	0	0
7	09d/04m/18y	16:03:00.49	Simulated & Drive stopped			0	0	0	0	0
8	09d/04m/18y	16:02:50.07	Simulated & Alarm	Overload		0	248	0	0	0
9	09d/04m/18y	16:02:46.45	Simulated & Running			0	81	0	0	0
10	09d/04m/18y	16:02:43.26	Simulated & Start attempt			0	581	0	0	0

10 PROTECTION FEATURES

The protection settings are shown below, with the relevant ANSI codes. And further breakdown of this will be done in the next sub sections.



10.1 CTMB Current and voltage setting

The CTMB module allows the NewFeed relay to be wired directly into three phase LV starter main circuit up to 550 volts, direct voltage measurement and CTMB covering current ranges from 0,1 amp to 400 amps.

The single turn primary current transformer conductor diameter is 13mm the CTMB 1, 5, 10, 25, 50 amp and 24mm for the CTMB100, 300 and 400 respectively.

The MV CTMB allows voltage measurement up to 550 volts and single turn CTMB 1 and 5 amp to cater for MV interposing current transformer.

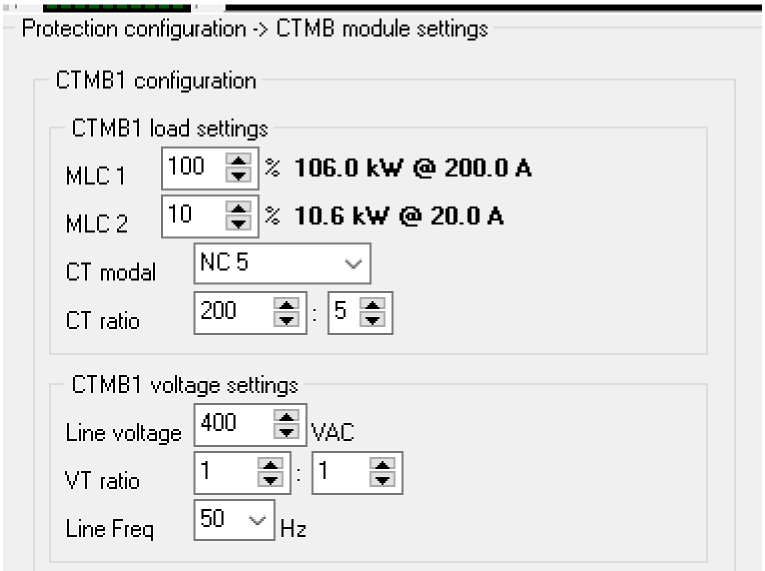
Accurate power measurements are ensured by enabling the main circuit Voltage and current levels with their respective VT and CT values to be entered in the NewFeed relay.

The NewFeed relay caters for multiple circuit type switchgear configuration, some of which requires 2 different MLC settings as well as thermal curve class settings. The 2 different MLC settings allow for two set of maximum load settings for certain configuration such as a dual speed motor.

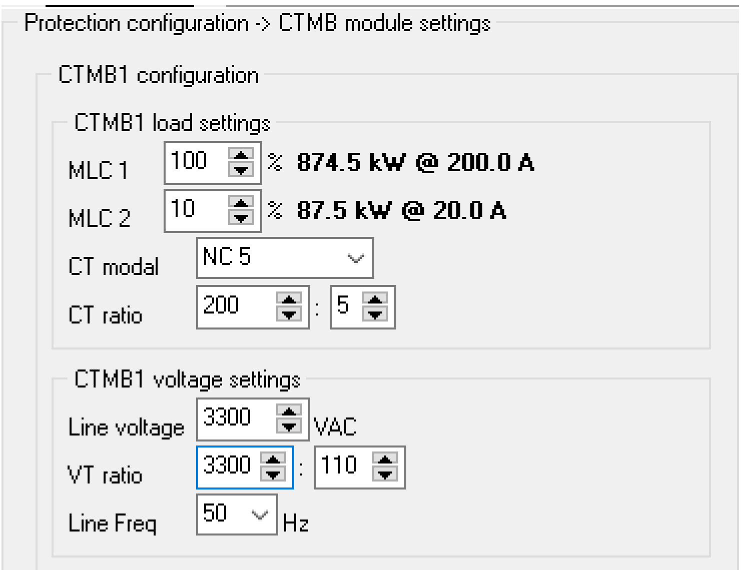
!!!! WARNING !!!!	
	Direct voltage line measurement must not be above 525VAC. This will cause damage to the CTMB module.
	Do not disconnect ribbon cable while system is not isolated.

Example:

Motor or feeder panel 400 volt with motor full load rating 200 amps (106.0 kW at 85% power and 90 % efficiency), main circuit current transformers ratio 200 to 5 amp, using a MEp5 CTMB and setting for a system supply frequency of 50 hertz.



Motor or feeder panel 3300 volt with motor full load rating 200 amps (874.5 kW at 85% power and 90 % efficiency) with main circuit 200 to 5 current transformers using a MEp5 CTMB and VT ratio 3300 to 110 vac setting for a system supply frequency of 50 hertz



Parameters:

CTMB CURRENT AND VOLTAGE SETTING		
Parameter	**Range**	**Description**
Maximum load current 01	10 – 100 % (1 %) Default : 30%	Switch gear or drive full load current setting (Rated current/CT primary) / (CT secondary/CTMB)x 100 % Directional relay forward current. Motor full load low speed motor (default selection)
Maximum load current 02	10 – 100 % (1 %) Default : 10%	Switch gear or drive full load current setting (Rated current/CT primary) / (CT secondary/CTMB) x 100 % Directional relay reverse current. Motor full load high speed motor
CTMB Module: Model – current range	• 0 = NC01 (1 Amp) 12mm • 1 = NC05 (5 Amp) 12mm • 2 = NC25 (25 Amp) 12mm • 3 = NC 50 (50 Amp) 12mm • 4 = NC100 (100 Amp) 22mm • 5 = NC300 (300 Amp) 22mm Default : 1 = NC05	Interposing CTMB module block connected in main circuit or interposing current transformer Model refers to maximum load current rating representing 100% load in amps
CT ratio	Primary : 1 – 10000 (1) Secondary : 1 – 9 (1) Default : 1 : 1	Main circuit current transformer. Secondary winding routed through primary of interposing CTMB Interposing CT ratio connected to CTMB module block.
Voltage line input	10 – 11000 VAC (1 VAC) Default : 110 VAC	Supply line voltage to switch gear or drive. Supply level is on the primary side of the VT ratio.
Voltage line frequency	• 0 = 50 Hz • 1 = 60 Hz Default : 0 = 50 Hz	Supply line frequency.

CTMB CURRENT AND VOLTAGE SETTING		
Parameter	**Range**	**Description**
VT ratio	Primary : 1 – 11000 (1) Secondary : 1 – 220 (1) Default : 1 : 1	Direct supply line voltage up to 550 VAC 1100 voltage converter range >550 VAC< 1200 volts Ratio is 2:1. internally compensated Medium Voltage 3300 to 11000 utilize external three phase voltage transformer ratio primary and secondary can be entered via NewFeed configuration software

10.2 ANSI 12 – Overspeed

Description:

A directly coupled speed measurement system, mechanical system will be centrifugally based operation to accurate to within 10% of set point, normally standstill < 5% motor speed or running set to 30% motor speed.

Electronic pulse-based non-intrusive systems using hall effect or infrared sensors (1 to 32 pulses per revolution) accuracy to within 0,1% of speed set point, use high speed field inputs DI1 or DI 2 on the NewFeed interface to PLC and SCADA via communication interface. Control and monitoring of turbine speed up to 5000 rpm in 50 hertz application 3000 rpm and 60 hertz application 3600 normal speed.

A rpm to 4 to 20mA signal can also be used to read the rpm via the NewFeed 4 to 20mA analogue module.

Application:

The element is designed to prevent overspeed on steam turbine or generator drive chain. This is critical protection element and requires direct interface to other control devices, in the case of a steam turbine the shutting off of the steam supply or fuel supply of the prime mover, a word of caution 50% of overspeed failures occur during the testing of the overspeed device, point to consider a fully loaded turbine running at operational speed driving a fully loaded generator a generator supply fault results in a trip out generator can lose 100% of its load within 0,1 seconds the turbine driving the Generator into an overspeed condition, the turbine may survive the overspeed situation but the generator ,especially the two pole design high speed (3600 rpm) generators are more susceptible to windings dislodging from slots and dislodging winding support wedges held in position by slide tap fit and varnish.

NOTE ON FLAG INPUT SELECTION BOX

Checkbox in front of input signal means that signal will be inverted

(True = false and False = true).

Parameters – Speed switch RPM:

SPEED SWITCH RPM		
Parameter	**Range**	**Description**
Speed switch input	• Field input 1 • Field input 2 Default : Field input 1	Input that the hall effect or infrared sensor is connected to.
Pulses per revolution	1 – 32 (1) Default : 8	Amount of pulses expected per revolution. The more pulses the better the accuracy of the RPM measurement.
Overspeed level	1 – 5000 rpm (1 rpm) Default : 3300 rpm (50 Hz system) or 3960 rpm (60Hz system)	Overspeed set point limit measured in rpm.
Under speed level	1 – 5000 rpm (1 rpm) Default : 2700 rpm (50 Hz system) or 3240 rpm (60Hz system)	Under speed set point limit measured in rpm.
Trip time	1 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default : 5	Trip time for when the over speed or under speed levels are reached.
Overspeed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed warning flag will indicate when speed is higher than overspeed level but will not trip the NewFeed relay.
Overspeed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed alarm flag will indicate when speed is higher than the overspeed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the overspeed trip flag.
Under speed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed warning flag will indicate when speed is higher than the under speed level but will not trip the NewFeed relay.
Under speed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed alarm flag will indicate when speed is lower than the under speed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the under speed trip flag.

Parameters – Speed switch ANA:

SPEED SWITCH ANA		
Parameter	**Range**	**Description**
RPM per 0.1mA	1 – 5000 Default : 32	Amount of RPM per 0.1 mA increment
Overspeed level	1 – 5000 rpm (1 rpm) Default : 3300 rpm (50 Hz system) or 3960 rpm (60Hz system)	Overspeed set point limit measured in rpm.
Under speed level	1 – 5000 rpm (1 rpm) Default : 2700 rpm (50 Hz system) or 3240 rpm (60Hz system)	Under speed set point limit measured in rpm.
Trip time	1 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default : 5	Trip time for when the over speed or under speed levels are reached.
Overspeed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed warning flag will indicate when speed is higher than overspeed level but will not trip the NewFeed relay.
Overspeed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed alarm flag will indicate when speed is higher than the overspeed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the overspeed trip flag.
Under speed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed warning flag will indicate when speed is lower than the under speed level but will not trip the NewFeed relay.
Under speed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed alarm flag will indicate when speed is lower than the under speed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the under speed trip flag.

10.3 ANSI 14 – Under speed

Description:

A directly coupled speed measurement system, mechanical system will be centrifugally based operation to accurate to within 10% of set point, normally standstill < 5% motor speed or running set to 30% motor speed.

Electronic pulse-based non-intrusive systems using hall effect or infrared sensors (1 to 32 pulses per revolution) accuracy to within 0,1% of speed set point, use high speed field inputs DI1 or DI 2 on the NewFeed interface to PLC and SCADA via communication interface. Control and monitoring of turbine speed up to 5000 rpm in 50 hertz application 3000 rpm and 60 hertz application 3600 normal speed.

An rpm to 4 to 20mA signal can also be used to read the rpm via the NewFeed 4 to 20mA analogue module.

Application:

A generator on motor will on application of excessive load reduce their shaft speed or the turbine driving the load, should this shaft speed reduce to below the motor pull out torque point the motor will stall and come to a standstill and draw motor locked rotor current level current from the supply, should the generator shaft speed reduce below the load angle value and the generator output supply has been synchronized onto the utility supply bus it will fall out of synchronism and a condition known as pole slipping resulting in high impulse oscillatory toque loads on the generator drive chain resulting in winding movement, shaft fracture.

NOTE ON FLAG INPUT SELECTION BOX

Checkbox in front of input signal means that signal will be inverted

(True = false and False = true).

Parameters – Speed switch RPM:

SPEED SWITCH RPM		
Parameter	**Range**	**Description**
Speed switch input	• Field input 1 • Field input 2 Default : Field input 1	Input that the hall effect or infrared sensor is connected to.
Pulses per revolution	1 – 32 (1) Default : 8	Amount of pulses expected per revolution. The more pulses the better the accuracy of the RPM measurement.
Overspeed level	1 – 5000 rpm (1 rpm) Default : 3300 rpm (50 Hz system) or 3960 rpm (60Hz system)	Overspeed set point limit measured in rpm.
Under speed level	1 – 5000 rpm (1 rpm) Default : 2700 rpm (50 Hz system) or 3240 rpm (60Hz system)	Under speed set point limit measured in rpm.
Trip time	1 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default : 5	Trip time for when the over speed or under speed levels are reached.
Overspeed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed warning flag will indicate when speed is higher than overspeed level but will not trip the NewFeed relay.
Overspeed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed alarm flag will indicate when speed is higher than the overspeed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the overspeed trip flag and latch the trip relay.
Under speed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed warning flag will indicate when speed is lower than the under speed level but will not trip the NewFeed relay.
Under speed trip enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Under speed alarm flag will indicate when speed is lower than the under speed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the under speed trip flag and latch the trip relay.

Parameters – Speed switch ANA:

SPEED SWITCH ANA		
Parameter	**Range**	**Description**
RPM per 0.1mA	1 – 5000 Default : 32	Amount of RPM per 0.1 mA increment
Overspeed level	1 – 5000 rpm (1 rpm) Default : 3300 rpm (50 Hz system) or 3960 rpm (60Hz system)	Overspeed set point limit measured in rpm.
Under speed level	1 – 5000 rpm (1 rpm) Default : 2700 rpm (50 Hz system) or 3240 rpm (60Hz system)	Under speed set point limit measured in rpm.
Trip time	1 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default : 5	Trip time for when the over speed or under speed levels are reached.
Overspeed warning enabled	• 0 = Disabled • 1 =Enabled Default : 0 = Disabled	Overspeed warning flag will indicate when speed is higher than overspeed level but will not trip the NewFeed relay.
Overspeed trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Overspeed alarm flag will indicate when speed is higher than the overspeed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the overspeed trip flag and latch the trip relay.
Under speed warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Under speed warning flag will indicate when speed is lower than the under speed level but will not trip the NewFeed relay.
Under speed trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Under speed alarm flag will indicate when speed is lower than the under speed level and start the trip time counter. When the trip counter expires then the NewFeed relay will set the under speed trip flag and latch the trip relay.

10.4 ANSI 24 – Volts per Hz / Over fluxing

Description:

A relay that functions when the ratio of voltage to frequency exceeds a pre-set value. The relay may have an instantaneous or a time characteristic. Also called Over-Excitation Relay (V/Hz) or Generator over-fluxing (24G).

Application:

The output torque for a motor is determined based on the ratio of the motor's applied voltage and applied frequency, known as the volts per hertz (V/Hz) ratio. A typical AC motor manufactured for use rated for 400 VAC and 50Hz, and thus has an 8V/Hz ratio.

Failure to maintain the proper V/Hz ratio will affect motor torque, temperature, speed, noise, and current draw.

Protection of a transformer, generator or motor from saturating the laminated steel core, resulting in flux.

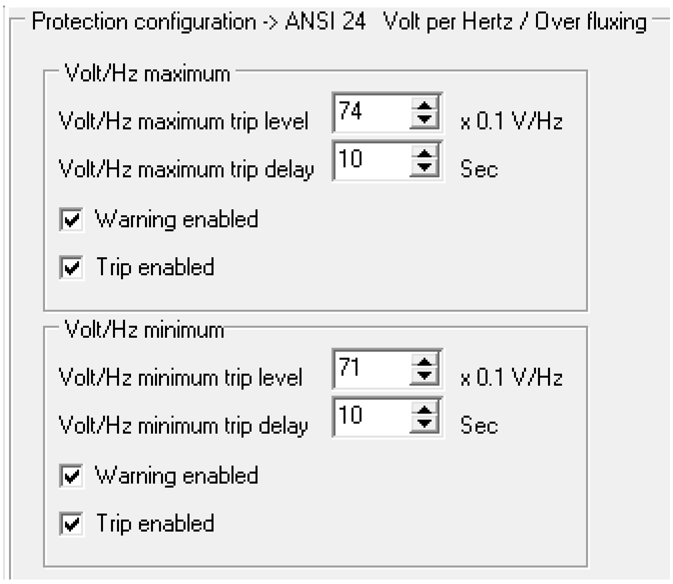
For lower limit of volts/hertz setting (0.8 x V Line/ (supply frequency x 0.9))

For upper limit of volts/hertz setting (1.2 x V Line/ (supply frequency x 1.1))

Example 400-volt 50 hertz system

Volt/ hertz low setting : (0.8 x 400 / (50 x 0.9)) = 7.11

Volt/ hertz high setting : (1.2 x 400 / (50 x 1.1)) = 8.72



Parameters – Volt/Hz maximum:

VOLT/HZ MAXIMUM		
Parameter	**Range**	**Description**
Trip level Maximum Volts/Hz on CTMB01	10 –300 x 0.1 V/Hz (1 x 0.1 V/Hz) Default: 74 x 0.1V/Hz. (VL1-VL2) = (400 x 1,2) volts) (Maximum frequency 65 hertz) (400 x 1,2 / 65) = 7,38 volts / hertz	System line voltage between phases / supply frequency = Volt per hertz. Default level (400 x 1,2 / 65) = 7,38 volts / hertz Maximum level that the volt per hertz level must increase above to activate the warning or alarm flag.
Trip delay Maximum Volts/Hz on CTMB01	1 – 10 Sec (1 Sec) Default: 10 Sec.	Trip delay in seconds timer initiated from when maximum Volts/Hertz alarm flag becomes active, the Volts/Hertz alarm flag must remain active for the entire maximum Volts/Hertz trip delay time, should it pulse low during the period the maximum Volts/Hertz trip delay will be reset and restarted from zero
Maximum Volts/Hz warning on CTMB01	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag will become active or high when Maximum volts / hertz ratio is greater than pre-set minimum Volts/Hertz value
Maximum Volts/Hz trip condition on CTMB01	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Volts/ hertz trip enabled When Maximum volts / hertz ratio is greater than pre-set maximum Volts/Hertz value Alarm flag will become active or high and start decrementing Volts/Hz Maximum value Trip delay sec timer. If the alarm flag remains high for the duration of the Volts/Hz Maximum Trip delay sec timer the relay will trip on Volts/Hz Maximum trip condition and latch the trip relay

Parameters – Volt/Hz minimum:

VOLT/HZ MINIMUM		
Parameter	**Range**	**Description**
Volts/Hz Minimum Trip level on CTMB01	10 –300 x 0.1 V/Hz (1 x 0.1 V/Hz) Default: 71 x 0.1V/Hz. (VL1-VL2= 400 x 0.8 volts) (Minimum frequency 45 hertz) (400 x 0,8 / 45) = 7,11 volts / hertz.	System line voltage between phases / supply frequency = Volt per hertz. Default level (400x.8 volts/ 45 hertz) = 7.11 Minimum level that the volt per hertz level must fall below to activate the warning or alarm flag.
Volts/Hz Minimum Trip delay sec on CTMB01	1 – 10 Sec (1 Sec) Default: 10 Sec.	Trip delay in seconds timer initiated from when minimum Volts/Hertz alarm flag becomes active, the Volts/Hertz alarm flag must remain active for the entire Volts/Hertz trip delay time, should it pulse low during the period the Volts/Hertz trip delay will be reset and restarted from zero
Volts/Hz Minimum level warning flag CTMB01	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag will become active or high when minimum volts / hertz ratio is less than pre-set minimum Volts/Hertz value
Volts/Hz Minimum level trip condition CTMB01	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: When minimum volts / hertz ratio is less than pre-set minimum Volts/Hertz value Alarm flag will become active or high and start decrementing Volts/Hz Minimum Trip delay sec timer. If the alarm flag remains high for the duration of the Volts/Hz Minimum Trip delay sec timer the relay will trip on Volts/Hz Minimum Trip condition and latch the trip relay

10.5 ANSI 26 – Thermostat

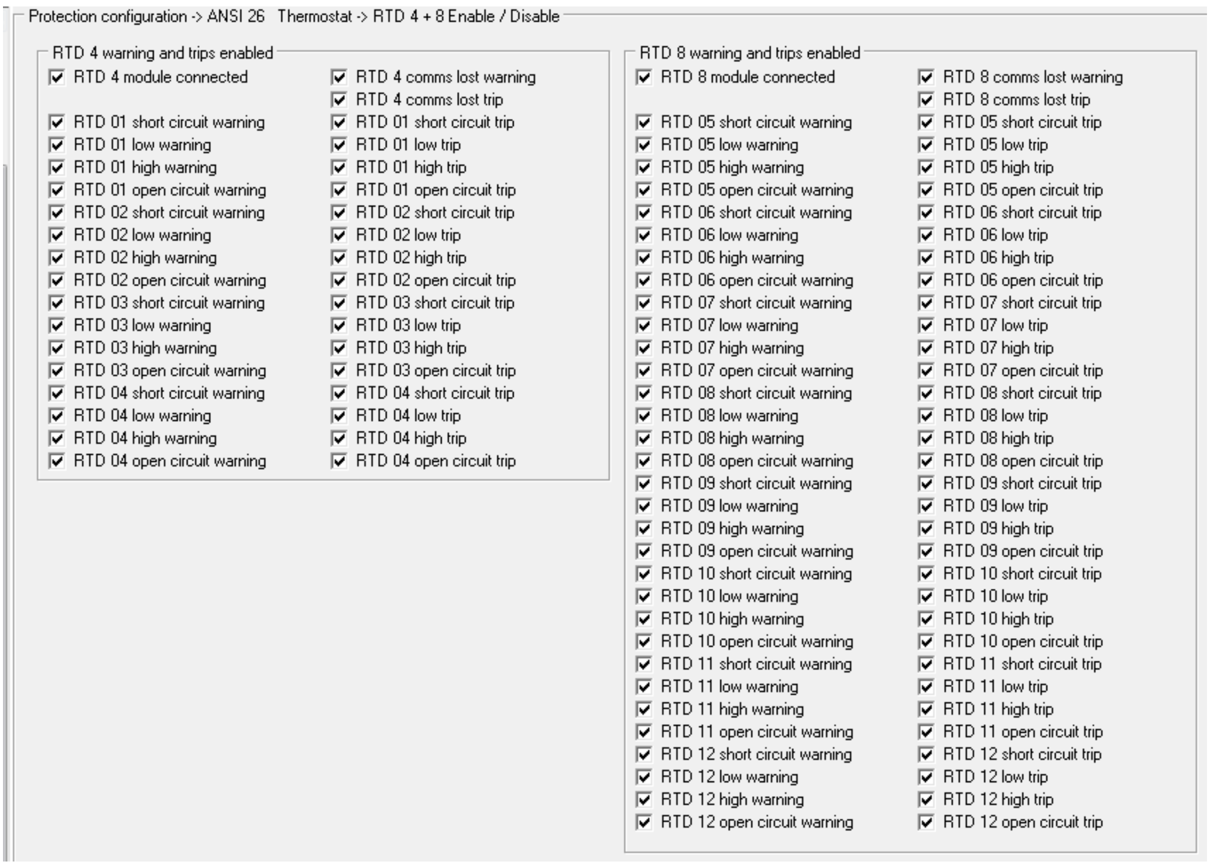
Description:

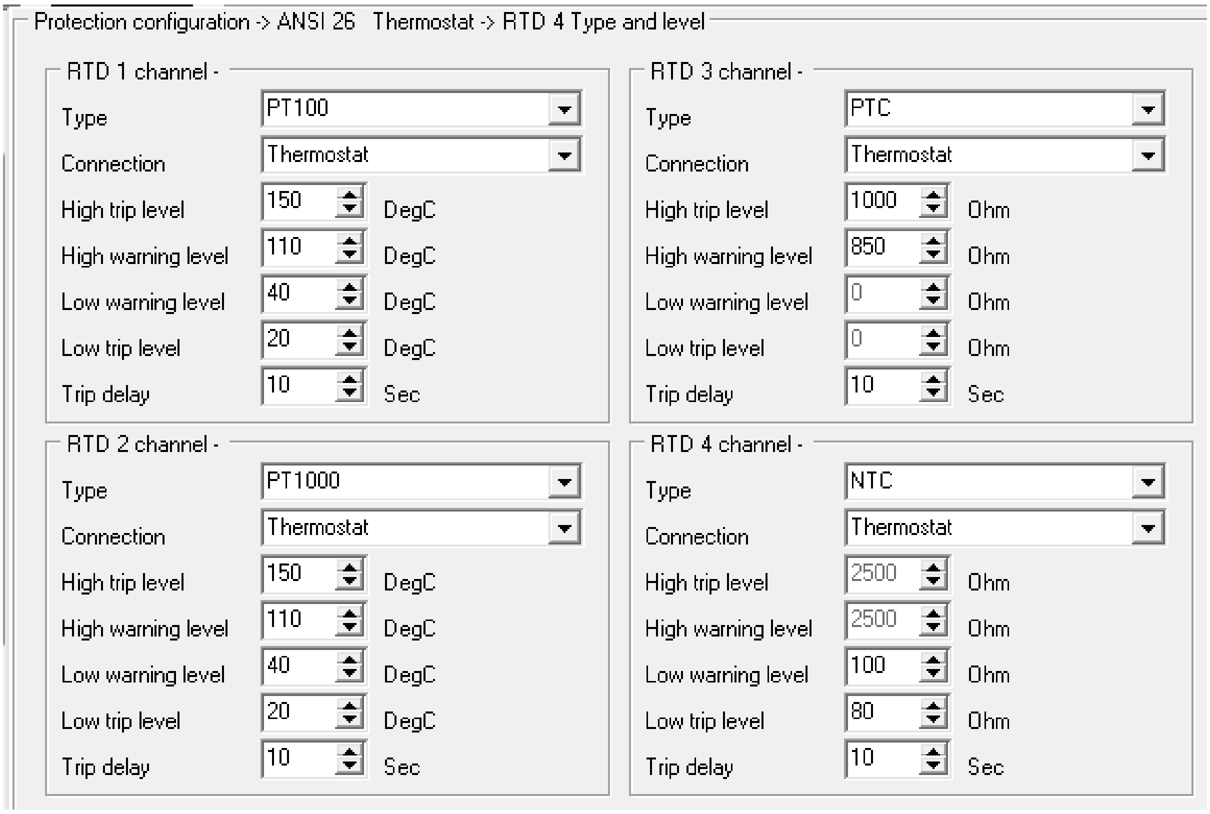
A device that functions when the temperature of the protected apparatus (other than the load-carrying windings of machines and transformers as covered by device function number 49) or of a liquid or other medium exceeds a predetermined value; or when the temperature of the protected apparatus or of any medium decreases below a predetermined value.

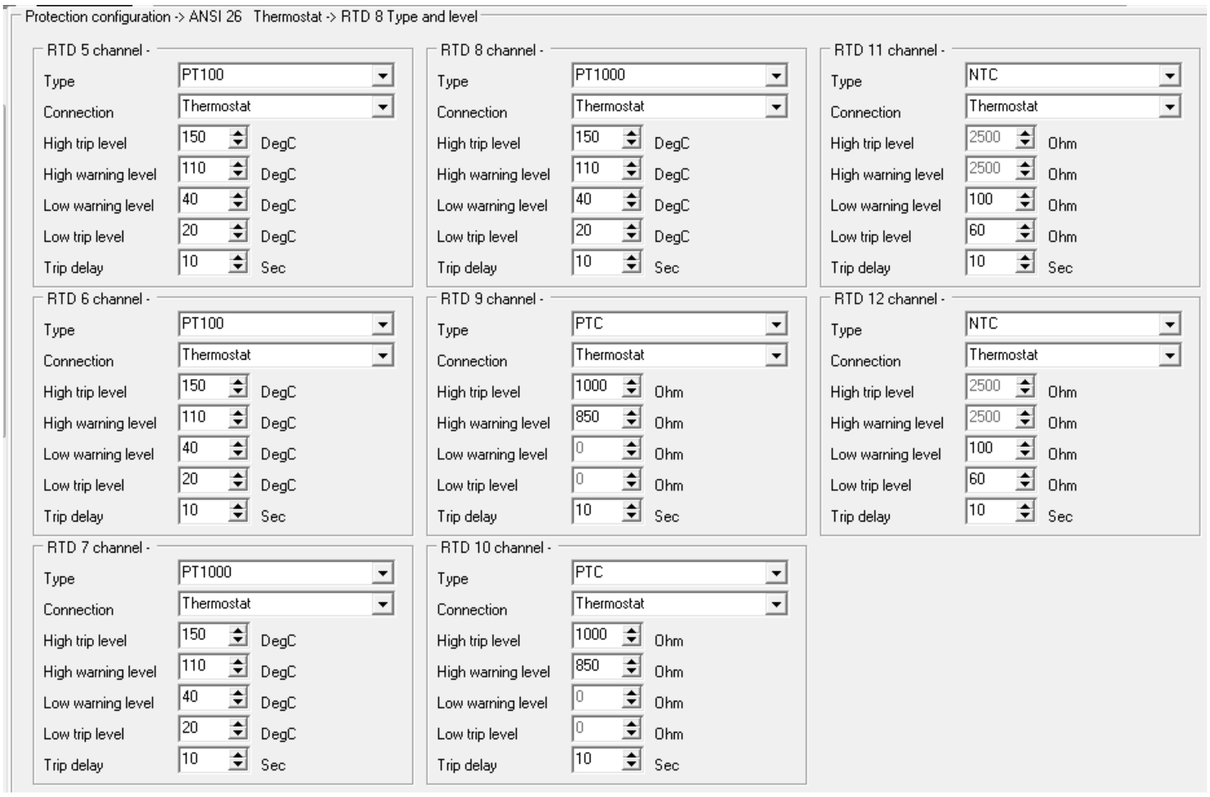
Application:

Measurement of transformer oil temperature, motor, generator or gearbox bearing temperature via a PT100, PT1000, PTC or NTC temperature sensor.

!!!! WARNING !!!!	
	An RTD 04 or RTD 08 module must be used to make use of ANSI 26.




Protection configuration -> ANSI 26 Thermostat -> RTD 4 Type and level
RTD 1 channel -
Type PT100
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 3 channel -
Type PTC
Connection Thermostat
High trip level 1000 Ohm
High warning level 850 Ohm
Low warning level 0 Ohm
Low trip level 0 Ohm
Trip delay 10 Sec
RTD 2 channel -
Type PT1000
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 4 channel -
Type NTC
Connection Thermostat
High trip level 2500 Ohm
High warning level 2500 Ohm
Low warning level 100 Ohm
Low trip level 80 Ohm
Trip delay 10 Sec


Protection configuration -> ANSI 26 Thermostat -> RTD 8 Type and level
RTD 5 channel -
Type PT100
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 8 channel -
Type PT1000
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 11 channel -
Type NTC
Connection Thermostat
High trip level 2500 Ohm
High warning level 2500 Ohm
Low warning level 100 Ohm
Low trip level 60 Ohm
Trip delay 10 Sec
RTD 6 channel -
Type PT100
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 9 channel -
Type PTC
Connection Thermostat
High trip level 1000 Ohm
High warning level 850 Ohm
Low warning level 0 Ohm
Low trip level 0 Ohm
Trip delay 10 Sec
RTD 12 channel -
Type NTC
Connection Thermostat
High trip level 2500 Ohm
High warning level 2500 Ohm
Low warning level 100 Ohm
Low trip level 60 Ohm
Trip delay 10 Sec
RTD 7 channel -
Type PT1000
Connection Thermostat
High trip level 150 DegC
High warning level 110 DegC
Low warning level 40 DegC
Low trip level 20 DegC
Trip delay 10 Sec
RTD 10 channel -
Type PTC
Connection Thermostat
High trip level 1000 Ohm
High warning level 850 Ohm
Low warning level 0 Ohm
Low trip level 0 Ohm
Trip delay 10 Sec

Parameters – RTD 4 warning and trips enabled:

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 4 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 4 must be connected to the NewFeed relay via the TBUS connector.
RTD 4 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 4 module for more than 1 seconds.
RTD 4 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 4 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 01 – 04 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 01 – 04 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.
RTD 01 – 04 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.
RTD 01 – 04 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.
RTD 01 – 04 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 01 – 04 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.
RTD 01 – 04 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 8 warning and trips enabled:

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 8 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 8 must be connected to the NewFeed relay via the TBUS connector.
RTD 8 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 8 module for more than 1 seconds.
RTD 8 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 8 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 08 – 12 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 08 – 12 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 08 – 12 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.
RTD 08 – 12 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.
RTD 08 – 12 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.
RTD 08 – 12 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.
RTD 08 – 12 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 4 type and level:

RTD 4 TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 01 – 04 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 01 – 04 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 0 = motor winding	Were and for what purpose the temperature probe can be connected to the system. Option “Motor winding with preload” will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.
RTD 01 – 04 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30° Celsius (1 – 30° Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30° Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30° Celsius (1 – 30° Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30° Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 01 – 04 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30° Celsius (1 – 30° Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30° Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 01 – 04 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30° Celsius (1 – 30° Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30° Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

Parameters – RTD 8 type and level:

RTD 8 TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 08 – 10 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 08 – 12 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 0 = motor winding	Were and for what purpose the temperature probe can be connected to the system. Option “Motor winding with preload” will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.
RTD 08 – 12 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 08 – 12 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 08 – 12 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

10.6 ANSI 27 – Under voltage

Description:

A relay that operates on phase-to-phase voltage. When it's input voltage is less than a predetermined value it will initiate a control or protection trip.

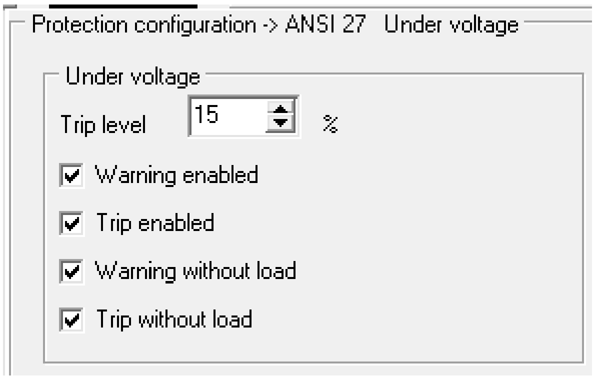
Application:

Under voltage protection compares a phase-to-phase voltage with a lower limit value. This function is used for asynchronous motors and generators running at rated load. This function is used to initiate actions to shed load to increase network supply stability. It can be used to prevent the starting placing on load additional equipment that could destabilize the supply network.

The catering for supply voltage drops on the supply cable to the motor is a requirement in certain applications. This requires the voltage level setting of the supply voltage to be elevated.

The under voltage level will then be applied to this elevated voltage to eliminate the supply cable voltage drop and to be lifted to cater for the motor or transformer rated voltage to be on motor or supply terminals of motor or transformer to allow motor or transformer to operate at full rated.

When the under voltage condition alarm flag will set the trip flag in 10 seconds.



Parameters:

UNDER VOLTAGE		
Parameter	**Range**	**Description**
Under voltage trip level	1 – 25 % (1 %) Default: 15 %.	Percentage of the line voltage selection that the line voltage level must be under in order to activate the warning or alarm flag.
Under voltage warning without load	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Enable the warning flag even if load is not present. Used to prevent a start when the voltage level is too low.
Under voltage warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Under voltage trip without load	• 0 = Disabled • 1 = Enabled Default: Disabled	Enable the alarm flag even if load is not present. Used to prevent a start when the voltage level is too low.
Under voltage trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.7 ANSI 37 – Phase under current or under power

Description:

A relay that functions when the current or power flow decreases below a predetermined value.

Application:

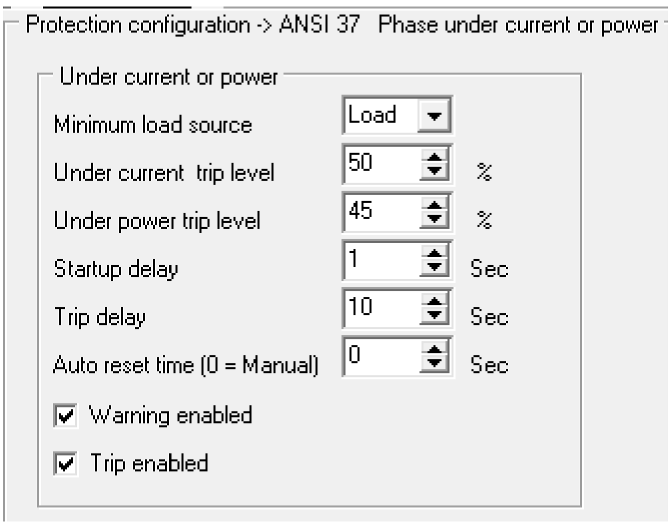
When the load current level or power level of an active circuit decreases below the normal operational level a fault condition is registered and either a trip command or corrective action command is initiated.

Protection feature only gets armed after start-up delay initiation of ANSI 37 feature expires.

If power factor level for the ANSI 37 element and the voltage measurement source is removed, rendering Cos Ø measurement impossible the ANSI 37 protection will revert to the use of minimum load current as a backup or alternative setting.

Selectable time delay auto reset flag is available to auto restart the drive if the fault was minimum load only, fault is cleared, and thermal capacity is below reset level. Do note that any other trip will deactivate the auto reset flag.

Protection of pumps against the consequences of cavitation due to loss of medium, snapping of V belts and switching off empty conveyor belts.



Parameters:

PHASE UNDER CURRENT OR UNDERPOWER		
Parameter	**Range**	**Description**
Minimum load source	• 0 = Current • 1 = Power Default: 0 = Current	Source selection of the minimum load level via load current or power factor.
Under current trip level	10 – 99 % (1 %) Default: 50 %.	Minimum load level represented in percentage level of the selected MLC load. Current load level must fall below to activate the warning or alarm flag.
Under power trip level	10 – 99 % (1 %) Default: 60 %.	Minimum CosPI level that the CosPI power factor level must be below to activate the warning or alarm flag.
Minimum load start up delay	0 – 200 Sec (1 Sec) Default: 0 Sec.	Block timer on start up to ignore the minimum load level.
Minimum load trip delay.	1 – 200 Sec (1 Sec) Default: 10 Sec.	Trip delay from that the minimum load alarm flag was set till the trip flag will be activated.
Minimum load reset delay.	1 – 65000 Sec (1 Sec) Default: 0 Sec.	Reset delay from that the trip flag of minimum load is set and no other trip flag is active, fault condition is cleared and there is enough thermal capacity. After the time is expired then the fault will be reset, and a restart bit will be set. 0 means that the restart is cancelled, and a manual reset is required.
Minimum load warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Minimum load trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.8 ANSI 38 – Bearing protective (temperature / mechanical)

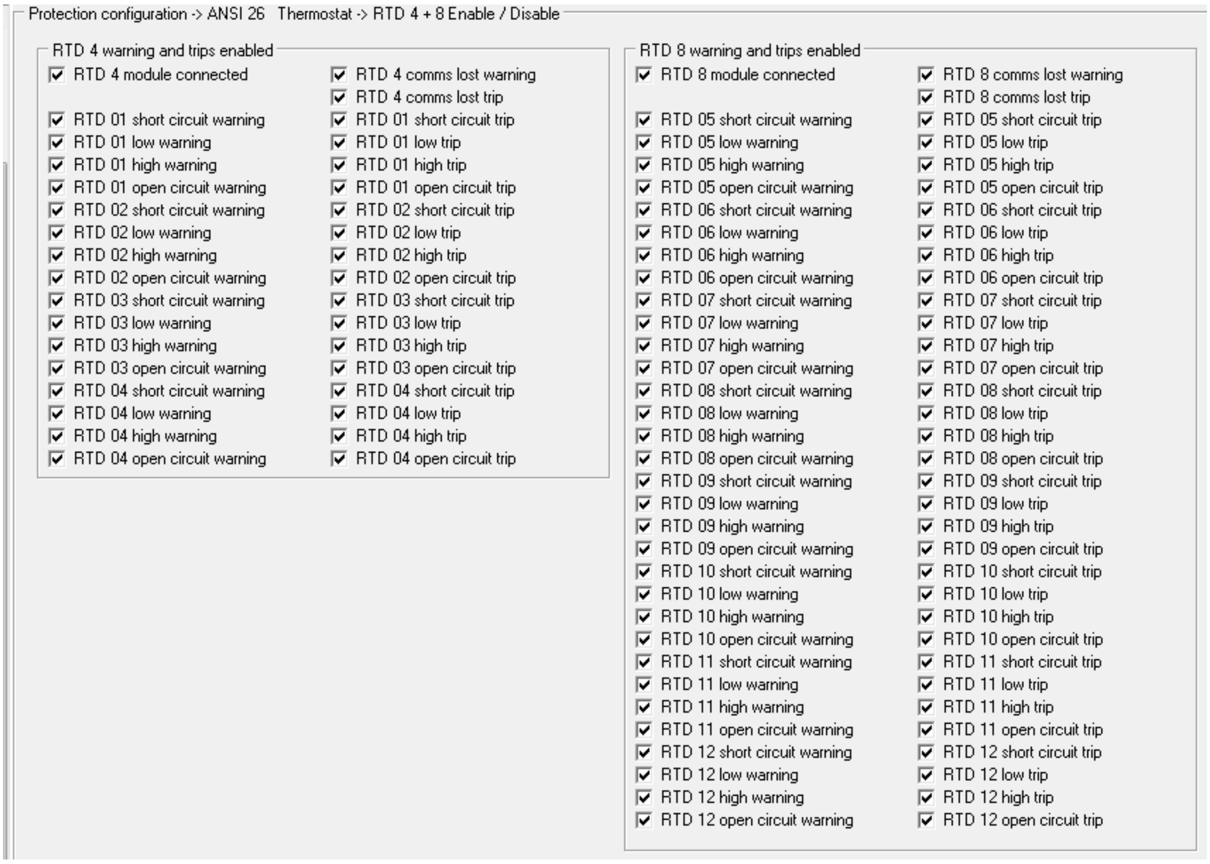
Description:

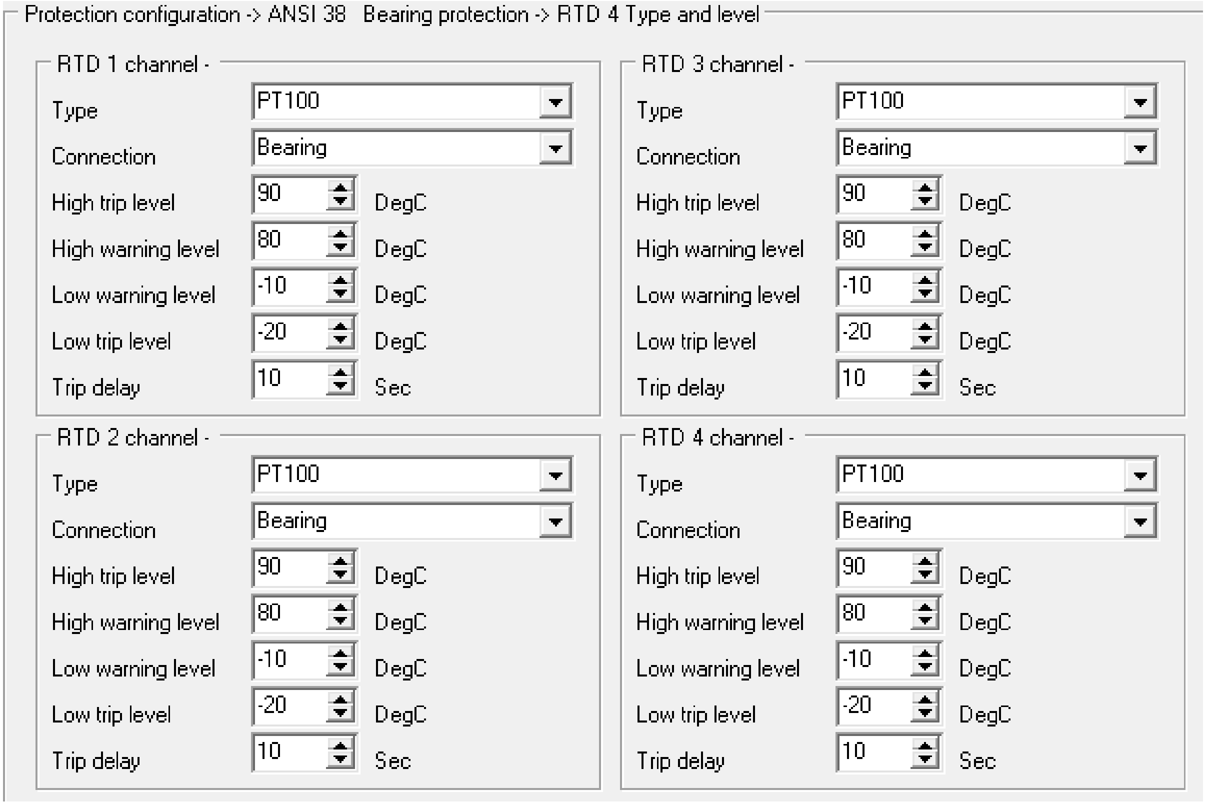
Device that functions on excessive bearing temperature, or another abnormal mechanical condition associated with the bearing, such as undue wear, which may eventually result in excessive bearing temperature.

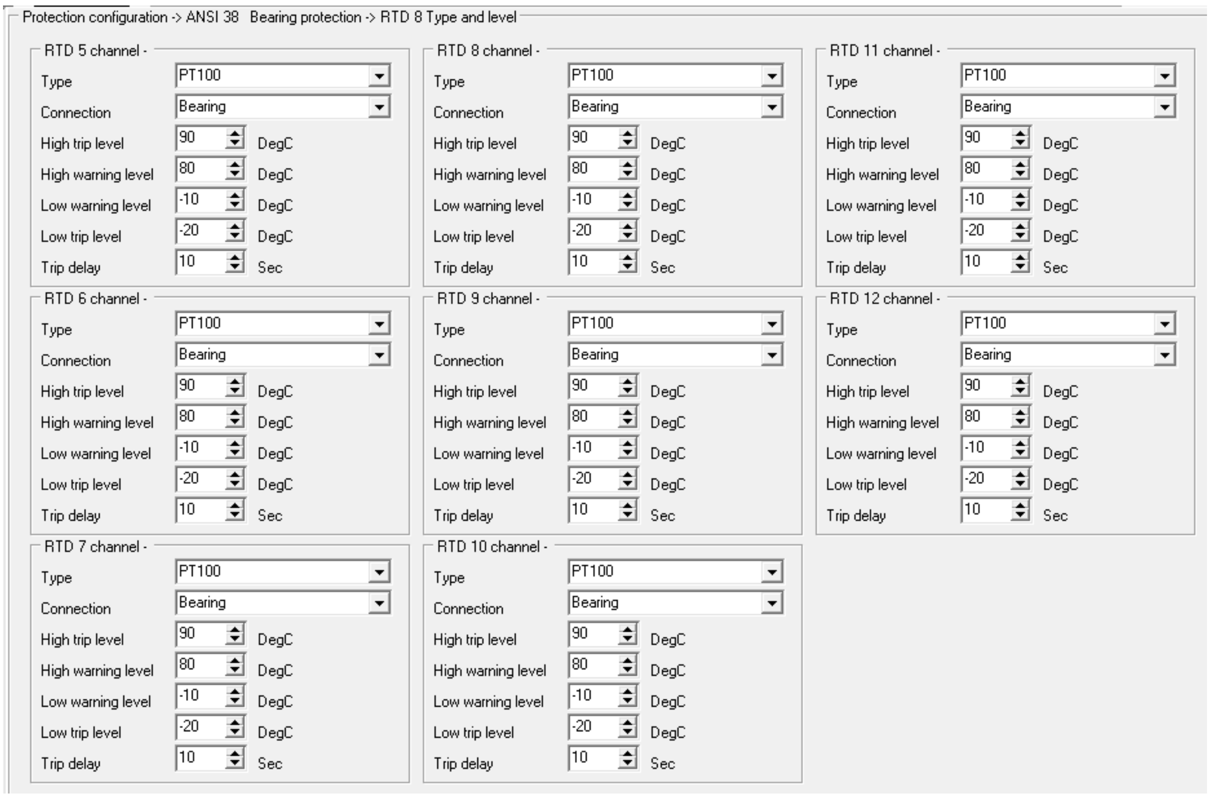
Application:

The temperature is measured via the RTD 4 or RTD 8 module with a temperature probe.

Typical application a rolling mill or crusher with reduction gearbox into final drive use the ANSI 38 element to protect the gearbox or common drive shaft bearings from over temperature. The ANSI 38 element is directly linked to the motor operating and turning all the associated shafts and gearboxes




Protection configuration -> ANSI 38 Bearing protection -> RTD 4 Type and level
RTD 1 channel
Type PT100
Connection Bearing
High trip level 90 DegC
High warning level 80 DegC
Low warning level -10 DegC
Low trip level -20 DegC
Trip delay 10 Sec
RTD 2 channel
Type PT100
Connection Bearing
High trip level 90 DegC
High warning level 80 DegC
Low warning level -10 DegC
Low trip level -20 DegC
Trip delay 10 Sec
RTD 3 channel
Type PT100
Connection Bearing
High trip level 90 DegC
High warning level 80 DegC
Low warning level -10 DegC
Low trip level -20 DegC
Trip delay 10 Sec
RTD 4 channel
Type PT100
Connection Bearing
High trip level 90 DegC
High warning level 80 DegC
Low warning level -10 DegC
Low trip level -20 DegC
Trip delay 10 Sec


Protection configuration -> ANSI 38 Bearing protection -> RTD 8 Type and level
RTD 5 channel
RTD 6 channel
RTD 7 channel
RTD 8 channel
RTD 9 channel
RTD 10 channel
RTD 11 channel
RTD 12 channel
Type PT100
Connection Bearing
High trip level 90 DegC
High warning level 80 DegC
Low warning level -10 DegC
Low trip level -20 DegC
Trip delay 10 Sec

Parameters – RTD 4 warning and trips enabled:

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 4 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 4 must be connected to the NewFeed relay via the TBUS connector.
RTD 4 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when communication stops between the NewFeed relay and the RTD 4 module for more than 1 seconds.
RTsD 4 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when communication stops between the NewFeed relay and the RTD 4 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 01 – 04 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 01 – 04 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.
RTD 01 – 04 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.
RTD 01 – 04 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.
RTD 01 – 04 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.
RTD 01 – 04 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 01 – 04 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 8 warning and trips enabled:

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 8 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 8 must be connected to the NewFeed relay via the TBUS connector.
RTD 8 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 8 module for more than 1 seconds.
RTD 8 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when TBUS communication stops between the NewFeed relay and the RTD 8 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 08 – 12 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 08 – 12 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.
RTD 08 – 12 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.
RTD 08 – 12 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 08 – 12 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.
RTD 08 – 12 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.
RTD 08 – 12 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 4 type and level:

RTD TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 01 – 04 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 01 – 04 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 0 = Bearing	Were and for what purpose the temperature probe can be connected to the system. Option "Motor winding with preload" will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.
RTD 01 – 04 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 01 – 04 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 01 – 04 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

Parameters – RTD 8 type and level:

RTD 8 TRIP AND LEVEL		
Parameter	**Range**	**Description**
RTD 08 – 10 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 08 – 12 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 0 = Bearing	Were and for what purpose the temperature probe can be connected to the system. Option “Motor winding with preload” will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.
RTD 08 – 12 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 08 – 12 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 08 – 12 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

10.9 ANSI 46 – Phase negative sequence / unbalance

Description:

A relay that functions when the poly-phase currents are of reverse-phase sequence or when the poly-phase currents are unbalanced or contain negative phase sequence components above a given amount.

Application:

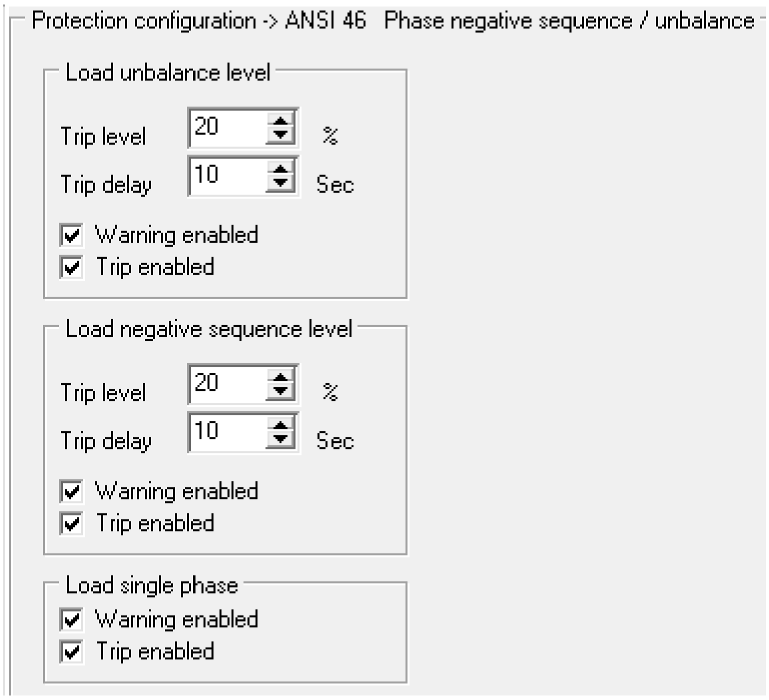
Protect the switch gear from delivering unbalance loads.

This protection can be achieved in three ways:

- Load unbalance.
  - % Difference = ((Max load – Min Load) / Avg Load) x 100.
- Negative phase sequence.
  - Neg. phase seq. = (IL1[0] + IL2[240] + IL3[120]).
- Single phase.
  - Unbalance level above 70%.

Sensitive protection to detect 2-phase faults at the ends of long lines.

Protection of equipment against temperature build-up, caused by an unbalanced power supply, phase inversion or loss of phase, and against phase current unbalance.



Parameters – Load unbalance level:

LOAD UNBALANCE LEVEL		
Parameter	**Range**	**Description**
Trip level	10 – 70 % (1 %) Default: 20%	Unbalance level that must be exceeded to activate warning or alarm level: % Difference = ((Max load – Min Load) / Avg Load) x 100.
Trip delay	1 – 10 Sec. (1 Sec) Default: 10 Sec.	Trip delay from that unbalance alarm flag was set till the trip flag will be activated.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip condition enabled.

Parameters – Load negative sequence level:

LOAD NEGATIVE SEQUENCE LEVEL		
Parameter	**Range**	**Description**
Trip level	10 – 90 % (1 %) Default: 60%	Negative sequence level required to activate warning or alarm flag.
Trip delay	1 – 10 Sec. (1 Sec) Default: 10 Sec.	Trip delay from that negative sequence alarm flag was set till the trip flag will be activated.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: Disabled	Trip condition enabled.

Parameters – Single phase:

SINGLE PHASE		
Parameter	**Range**	**Description**
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip condition enabled.

10.10 ANSI 47 – phase-sequence voltage or phase-balance overvoltage

Description:

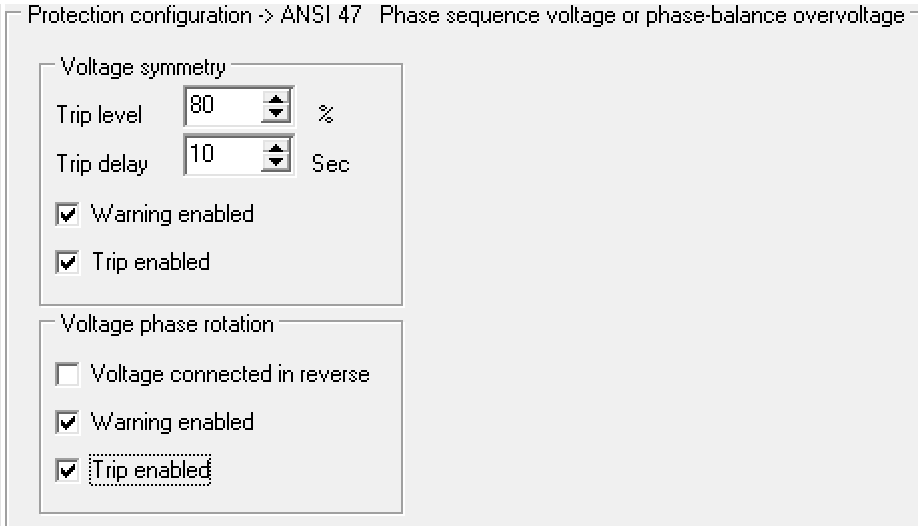
A relay that functions when the poly-phase currents are of reverse-phase sequence or when the poly-phase currents are unbalanced or contain negative phase sequence components above a given magnitude.

Application:

Protection of the sequence is done in 2 ways:

- Protection for the rotation of the line voltage into the switch gear.
  - Phase rotation will look at the line voltage input and trip in 500 ms. if the rotation is incorrect.
- Voltage symmetry measure the unbalance level between the voltage phase levels.
  - % Difference = 100 – (((Max phase volt – Min phase volt) / Avg phase volt) x 100)

Any switch gear that is suppling a direction critical application. Example be a feeder panel to a jet fan or shuttle cart.



Parameters – Voltage symmetry:

VOLTAGE SYMMETRY		
Parameter	**Range**	**Description**
Trip level	60 – 90 % (1 %) Default: 80 %.	Percentage symmetry level that the symmetry level must be below in order to activate the warning or alarm flag.
Trip delay	1 – 10 Sec (1 Sec) Default: 10 Sec.	Trip delay from that the voltage symmetry alarm flag was set till the trip flag will be activated.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

Parameters – Voltage phase rotation:

VOLTAGE PHASE ROTATION		
Parameter	**Range**	**Description**
Voltage connection reversed	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Direction of the voltage phase rotation connected. Disabled = VL1, VL2, VL3, Enabled = VL3, VL2, VL3
Warning enabled	• 0 = Disabled • 1 = Enabled Default: Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.11 ANSI 49 – Machine or transformer thermal

Description:

A relay that functions when the temperature of a machine armature winding or other load-carrying winding or element of a machine or power transformer exceeds a predetermined value.

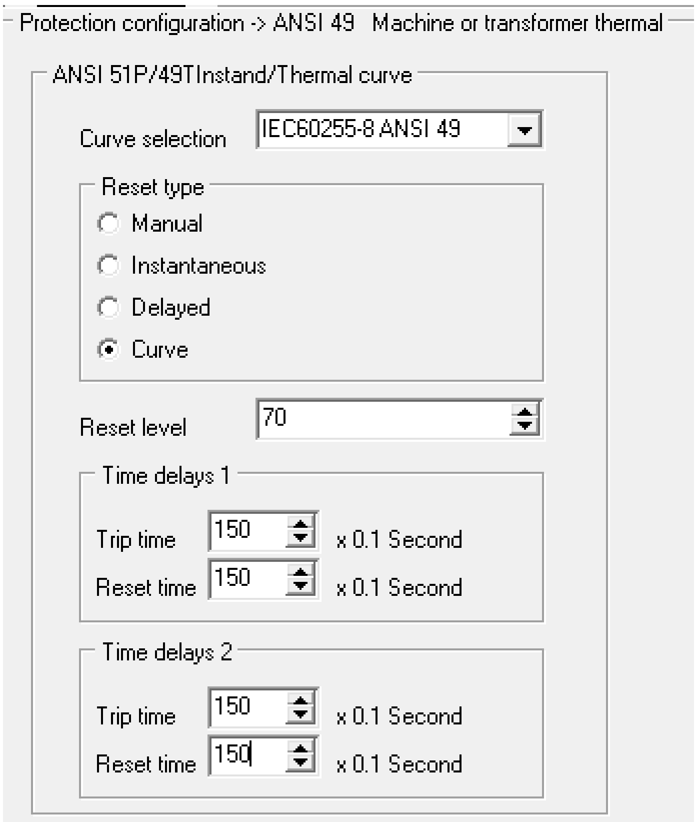
Application:

Protection against thermal damage caused by overloads on machines (transformers, motors or generators). The thermal capacity used is calculated according to an I2T mathematical model specified in the IEC60255-8 full thermal model which considers also referred to as ANSI 49 RMS:

- Current RMS values
- Motor or transformer preloading over the previous 5 min to 3 hours heating time constant matched to the Thermal class curve selected
- Winding temperature compensation in thermal preloading model
    - An RTD 4 or RTD 8 module and RTD connection is needed to set to Motor winding with preload.

ANSI 49 or ANSI 51P will always be enable as overcurrent protection is a must on all devices.

Any motor or transformer that needs a thermal model calculated to help protect against heat.



Parameters:

THERMALS		
Parameter	**Range**	**Description**
Curve selection	• 0 = IEC60255-8 ANSI 49 • 1 = DEFT ANSI 51P • 2 = IEC_NINV ANSI 51P • 3 = IEC_VINV ANSI 51P • 4 = IEC_LINV ANSI 51P • 5 = IEC_EINV ANSI 51P • 6 = ANSI_MINV ANSI 51P • 7 = ANSI_VINV ANSI 51P • 8 = ANSI_EINV ANSI 51P • 9 = Thermal flat ANSI 51P • 10 = IT ANSI 51P • 11 = I2T ANSI 51P • 12 = I4T ANSI 51P Default: 0 = IEC60255-8 ANSI 49.	Different thermal or curve modes are available depending on the device being thermally protected.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Delayed • 3 = Curve Default: Curve	Various resets are available but not available to all the curve selections. Manual is available to all the curves and will cause a thermal trip to latch the trip contact. Instantaneous is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Delayed is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Curve is available to all the curves.
Reset level	1 – 99 % (1 %) Default: 70 %	The thermal used reset level. The level must be so that a device can start without using all the capacity.
Time delays 1 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 1.
Time delays 1 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 1.

THERMALS		
Parameter	**Range**	**Description**
Time delays 2 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 2.
Time delays 2 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 2.

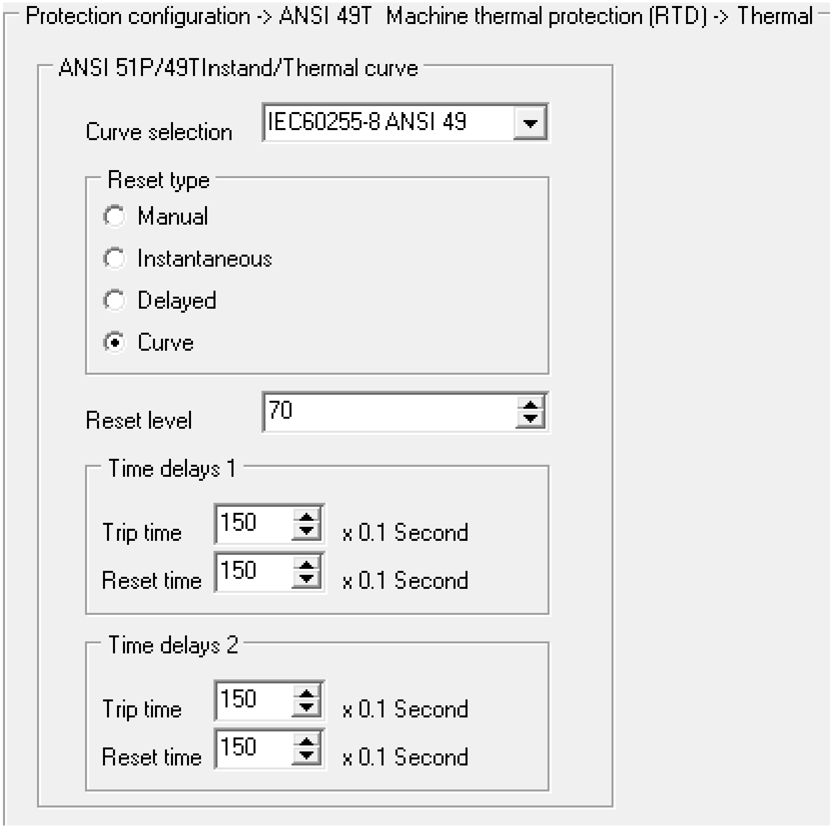
10.12 ANSI 49T – Machine thermal protection (RTD/PTC)

Description:

Uses the RTD modules to feed back the temperature back into the thermal curve. This feature is designed to work with the IEC60255-8 ANSI 49 curve selected.

Application:

Ensure that actual physical temperature matches the I2T model generated in the IEC60255-8 full thermal model, thermal protection in the event of failed cooling provided by shaft mounted fan or auxiliary cooling unit failure or blocked air duct vents on machines with varying load patterns that require the full RMS load pattern protection.



Protection configuration -> ANSI 49T Machine thermal protection (RTD) -> RTD 4 + 8 Enable / Disable

RTD 4 warning and trips enabled

☑ RTD 4 module connected	☑ RTD 4 comms lost warning
	☑ RTD 4 comms lost trip
☑ RTD 01 short circuit warning	☑ RTD 01 short circuit trip
☑ RTD 01 low warning	☑ RTD 01 low trip
☑ RTD 01 high warning	☑ RTD 01 high trip
☑ RTD 01 open circuit warning	☑ RTD 01 open circuit trip
☑ RTD 02 short circuit warning	☑ RTD 02 short circuit trip
☑ RTD 02 low warning	☑ RTD 02 low trip
☑ RTD 02 high warning	☑ RTD 02 high trip
☑ RTD 02 open circuit warning	☑ RTD 02 open circuit trip
☑ RTD 03 short circuit warning	☑ RTD 03 short circuit trip
☑ RTD 03 low warning	☑ RTD 03 low trip
☑ RTD 03 high warning	☑ RTD 03 high trip
☑ RTD 03 open circuit warning	☑ RTD 03 open circuit trip
☑ RTD 04 short circuit warning	☑ RTD 04 short circuit trip
☑ RTD 04 low warning	☑ RTD 04 low trip
☑ RTD 04 high warning	☑ RTD 04 high trip
☑ RTD 04 open circuit warning	☑ RTD 04 open circuit trip

RTD 8 warning and trips enabled

☑ RTD 8 module connected	☑ RTD 8 comms lost warning
	☑ RTD 8 comms lost trip
☑ RTD 05 short circuit warning	☑ RTD 05 short circuit trip
☑ RTD 05 low warning	☑ RTD 05 low trip
☑ RTD 05 high warning	☑ RTD 05 high trip
☑ RTD 05 open circuit warning	☑ RTD 05 open circuit trip
☑ RTD 06 short circuit warning	☑ RTD 06 short circuit trip
☑ RTD 06 low warning	☑ RTD 06 low trip
☑ RTD 06 high warning	☑ RTD 06 high trip
☑ RTD 06 open circuit warning	☑ RTD 06 open circuit trip
☑ RTD 07 short circuit warning	☑ RTD 07 short circuit trip
☑ RTD 07 low warning	☑ RTD 07 low trip
☑ RTD 07 high warning	☑ RTD 07 high trip
☑ RTD 07 open circuit warning	☑ RTD 07 open circuit trip
☑ RTD 08 short circuit warning	☑ RTD 08 short circuit trip
☑ RTD 08 low warning	☑ RTD 08 low trip
☑ RTD 08 high warning	☑ RTD 08 high trip
☑ RTD 08 open circuit warning	☑ RTD 08 open circuit trip
☑ RTD 09 short circuit warning	☑ RTD 09 short circuit trip
☑ RTD 09 low warning	☑ RTD 09 low trip
☑ RTD 09 high warning	☑ RTD 09 high trip
☑ RTD 09 open circuit warning	☑ RTD 09 open circuit trip
☑ RTD 10 short circuit warning	☑ RTD 10 short circuit trip
☑ RTD 10 low warning	☑ RTD 10 low trip
☑ RTD 10 high warning	☑ RTD 10 high trip
☑ RTD 10 open circuit warning	☑ RTD 10 open circuit trip
☑ RTD 11 short circuit warning	☑ RTD 11 short circuit trip
☑ RTD 11 low warning	☑ RTD 11 low trip
☑ RTD 11 high warning	☑ RTD 11 high trip
☑ RTD 11 open circuit warning	☑ RTD 11 open circuit trip
☑ RTD 12 short circuit warning	☑ RTD 12 short circuit trip
☑ RTD 12 low warning	☑ RTD 12 low trip
☑ RTD 12 high warning	☑ RTD 12 high trip
☑ RTD 12 open circuit warning	☑ RTD 12 open circuit trip

Protection configuration -> ANSI 49T Machine thermal protection (RTD) -> RTD 4 Type and level

RTD 1 channel -

Type	PT100	
Connection	Motor winding and pre load	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 3 channel -

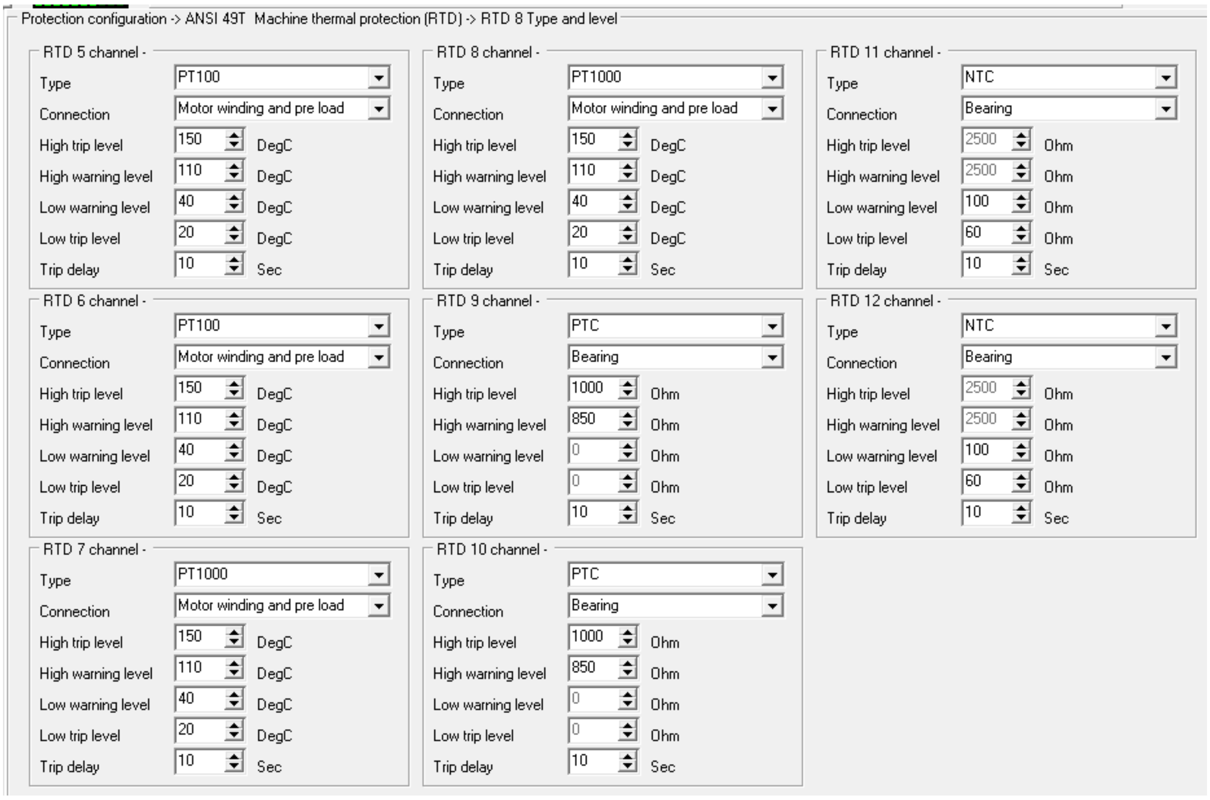
Type	PTC	
Connection	Bearing	
High trip level	1000	Ohm
High warning level	850	Ohm
Low warning level	0	Ohm
Low trip level	0	Ohm
Trip delay	10	Sec

RTD 2 channel -

Type	PT1000	
Connection	Motor winding and pre load	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 4 channel -

Type	NTC	
Connection	Bearing	
High trip level	2500	Ohm
High warning level	2500	Ohm
Low warning level	100	Ohm
Low trip level	80	Ohm
Trip delay	10	Sec



Parameters – ANSI 51P/49T thermal:

THERMALS		
Parameter	**Range**	**Description**
Curve selection	• 0 = IEC60255-8 ANSI 49 • 1 = DEFT ANSI 51P • 2 = IEC_NINV ANSI 51P • 3 = IEC_VINV ANSI 51P • 4 = IEC_LINV ANSI 51P • 5 = IEC_EINV ANSI 51P • 6 = ANSI_MINV ANSI 51P • 7 = ANSI_VINV ANSI 51P • 8 = ANSI_EINV ANSI 51P • 9 = Thermal flat ANSI 51P • 10 = IT ANSI 51P • 11 = I2T ANSI 51P • 12 = I4T ANSI 51P Default: 0 = IEC60255-8 ANSI 49.	Different thermal or curve modes are available depending on the device being thermally protected.

THERMALS		
Parameter	**Range**	**Description**
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Delayed • 3 = Curve Default: 3 = Curve	Various resets are available but not available to all the curve selections. Manual is available to all the curves and will cause a thermal trip to latch the trip contact. Instantaneous is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Delayed is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Curve is available to all the curves.
Reset level	1 – 99 % (1 %) Default: 70 %	The thermal used reset level. The level must be so that a device can start without using all the capacity.
Time delays 1 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 1.
Time delays 1 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 1.
Time delays 2 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 2.
Time delays 2 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 2.

Parameters – RTD 4 warning and trips enabled:

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 4 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 4 must be connected to the NewFeed relay via the TBUS connector.
RTD 4 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when communication stops between the NewFeed relay and the RTD 4 module for more than 1 seconds.
RTD 4 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when communication stops between the NewFeed relay and the RTD 4 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 01 – 04 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 01 – 04 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.
RTD 01 – 04 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.
RTD 01 – 04 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.
RTD 01 – 04 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.
RTD 01 – 04 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

RTD 4 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 01 – 04 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 8 warning and trips enabled:

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 8 module connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Indicates that and RTD 8 must be connected to the NewFeed relay via the TBUS connector.
RTD 8 comms lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when communication stops between the NewFeed relay and the RTD 8 module for more than 1 seconds.
RTD 8 comms lost trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when communication stops between the NewFeed relay and the RTD 8 module. After 1 seconds the trip flag will be active and latch the trip relay.
RTD 08 – 12 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is shorted circuit.
RTD 08 – 12 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement falls below the low warning level set point.
RTD 08 – 12 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature measurement goes above the high warning level set point.

RTD 8 WARNING AND TRIPS ENABLED		
Parameter	**Range**	**Description**
RTD 08 – 12 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Warning flag becomes active when the temperature sensor is open circuit.
RTD 08 – 12 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature sensor is shorted circuit. Directly after the alarm flag will be active and latch the trip relay.
RTD 08 – 12 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement falls below the low warning level set point. After the temperature falls below the low trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.
RTD 08 – 12 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If Enabled: Alarm flag becomes active when the temperature measurement goes above the high warning level set point. After the temperature goes above the high trip level set point the timer will be active. After the timer has expired the trip flag will be set and latch the trip relay.

Parameters – RTD 4 type and level:

RTD 4 TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 01 – 04 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 01 – 04 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 1 = Motor winding with preload	Were and for what purpose the temperature probe can be connected to the system. Option “Motor winding with preload” will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.

RTD 4 TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 01 – 04 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 01 – 04 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 01 – 04 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 - 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 01 – 04 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

Parameters – RTD 8 type and level:

RTD 8 TYPE AND LEVEL		
Parameter	**Range**	**Description**
RTD 08 – 10 Type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100	Sensor type that is connected to the RTD channel.
RTD 08 – 12 Connection	• 0 = Motor winding • 1 = Motor winding with preload. • 2 = Bearing • 3 = Thermostat Default: 1 = Motor winding with preload	Were and for what purpose the temperature probe can be connected to the system. Option “Motor winding with preload” will convert the temperature to load and adjust the thermal capacity of the thermal curve if curve IEC60255-8 is selected and the actual load is lower then what the temperature is reading.
RTD 08 – 12 High trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 High waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to goes above to activate the warning or alarm flag.
RTD 08 – 12 Low waring level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the warning or alarm flag.
RTD 08 – 12 Low trip level	RTD Type = PT100 or PT1000: 0 – 250 – 30º Celsius (1 – 30º Celsius) RTD Type = PTC or NTC: 0 – 250 x 10 Ohm (1 x 10Ohm) Default: 0 = 120 – 30º Celsius	Temperature or resistor set level for the channel measurement to fall below to activate the trip counter to execute. After the trip counter has expired then the trip flag will be set and latch the trip relay.
RTD 08 – 12 Trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec.	Trip time for when the RTD measurement is above the high trip level or below the low trip level till the trip flag is set and latch the trip relay.

10.13 ANSI 50BF – Breaker failure

Description:

Following methods are used to establish that a breaker failure has occurred and that it is to be removed from service to maintain the functionality and stability of the distribution network:

Application:

- Breaker wear.

Calculates the remaining life that the breaker has at each trip with load present. Rupture currents will decrease the life of the breaker exponentially.

When the remaining life counter is below the warning level. An alarm and warning flag will be activated to indicate that the breakers life time is going to end soon.

After reaching end of life the trip flag will latch the trip contactor.

A reset will clear the 50BF trip.

But after use the 50BF trip will be reactivated.

A reset of the operations will set the operation counter back to maximum.

- Breaker fault.

Monitors the auxiliary outputs of the breaker to ensure that no internal mechanical failure is present.

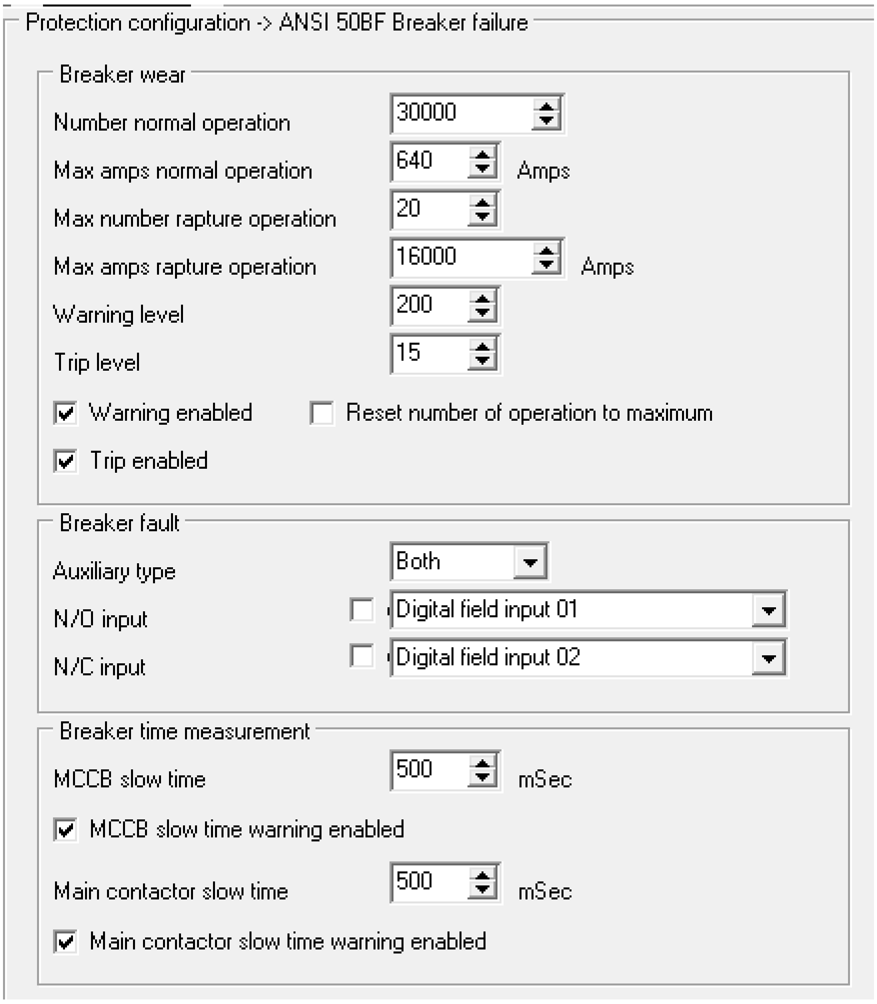
By checking that position of auxiliary contacts match those of the main contactor if the breaker should be de energised but load current is detected in the main circuit a frozen contact condition has been identified and the backup circuit breaker must be used to clear the failed contactor circuit breaker

- Breaker time measurement.

Measures the time when a trip command was given till the load current goes to 0 Amps. This will indicate if the breaker is clearing slower than usual.

This measurement is also done on the control contactor.

This feature will not latch a trip condition but only warn of a contactor or breaker behaving slower than usual.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters – Breaker wear:

BREAKER WEAR		
Parameter	**Range**	**Description**
Maximum number normal operations	0 – 2000000000 (1) Default: 30000	Number of operations with Amps being below normal operation Amps.
Amps normal operation	0 – 65534 Amps (1 Amps) Default: 640 Amps	Amp level to qualify for a normal breakage of the breaker.
Maximum number of Rupture operations	0 – 65534 (1) Default: 20	Number of operations with exceeding Rupture Amp level.
Maximum Rupture Amp level	0 – 2000000000 Amps (1 Amps) Default: 16000	Amp level for Rupture load current on the breaker.
Wear warning operation left level	0 – 65534 (1) Default: 200	Set point for the warning or alarm flag to indicate that the amount of operations left is low and that the breaker will need to be exchanged.
Wear trip operation left level	0 – 65534 (1) Default: 15	Start taking the breaker out due to unreliable amount of operations left.
Warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the warning indication when the breaker is passed the wear warning operation left level.
Trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the trip indication when the breaker is passed the wear trip operation left level. The alarm flag will be active when the number of operations left passes the warning level.
Reset number of operations to maximum	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Resets the operations left counter.

Parameters – Breaker fault:

BREAKER FAULT		
Parameter	**Range**	**Description**
Breaker auxiliary type	• 0 = None • 1 = N/O • 2 = N/C • 3 = Both Default: 0 = None	None disables this feature. N/O = a normally open output only when the breaker is healthy. N/C = a normally close output only when the breaker is healthy. Both = A N/O and N/C is present. If both are indicating N/O or N/C at the same time then mechanically the breaker failed.
Auxiliary N/O	0 – 65535 (1) Default: 0	Input connected to the NewFeed relay to read the N/O status.
Auxiliary N/C	0 – 65535 (1) Default: 0	Input connected to the NewFeed relay to read the N/C status.

Parameters – Breaker time measurement:

BREAKER TIME MEASUREMENT		
Parameter	**Range**	**Description**
MCCB slow time	0 – 65530 milli Sec(10 milli Sec) Default: 500 milli Sec	Time it must take for the breaker to clear the fault.
MCCB slow warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Indicate that the MCCB is taking longer to clear the fault.
Main contact slow time	0 – 65530 milli Sec(10 milli Sec) • Default: 500 milli Sec	Time it must take for the main contactor to clear the fault.
Main contact slow warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Indicate that the main contactor is taking longer to clear the fault.

10.14 ANSI 50G – Ground instantaneous overcurrent

Description:

Relay that functions instantaneously on an excessive value of earth fault current on solidly earthed system, will exhibit an excessive rate of current rise of earth fault or zero sequence current, thus indicating a fault in the apparatus or circuit being protected.

Detection of phase to ground fault. The NewFeed detects this fault via 2 methods:

- Earth leakage via a CBCT core
- I0 zero sequence component.
  - Zero sequence level % = (IL1[0] + IL2[0] + IL3[0]).

An alternative connection of the I neutral current transformer in the three-phase current transformer spill circuits to measure the ground fault current this can also be used in the directional detection of the ANSI 67N with the measurement of the open Delta voltage

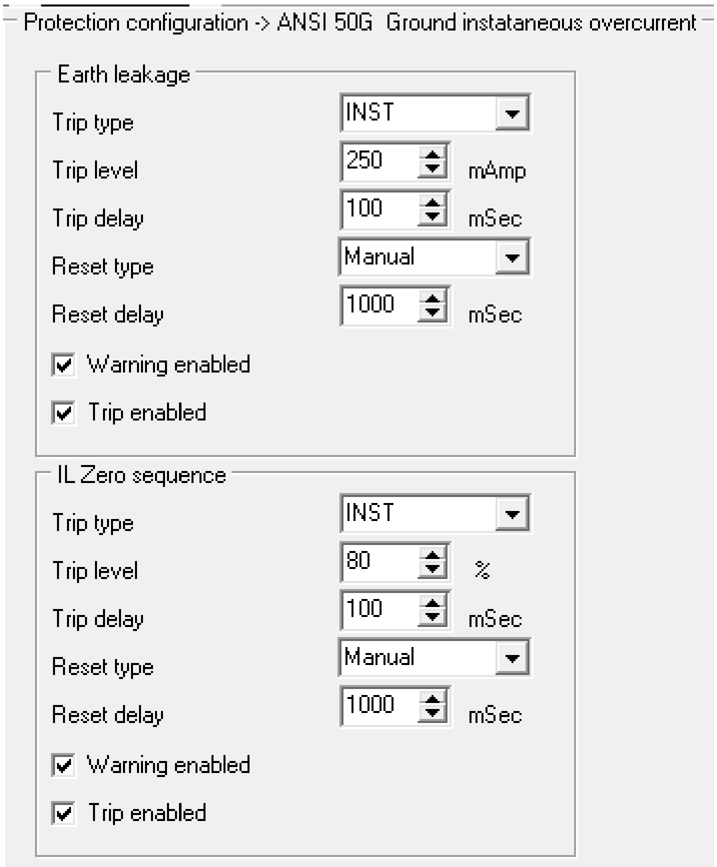
Always available

50G sensitive earth leakage and 50G earth fault > 1,5 amp on CBCT

Used were touch potentials can be hazardous to personnel on site. This can result in the loss of life.

Application:

Earth leakage 0,05 to 1 amp used as recoverable protection no permanent damage to equipment typical ingress of moisture or lubricant



Parameters – Earth leakage:

EARTH LEAKAGE		
Parameter	**Range**	**Description**
Trip type	• 0 = Instantaneous • 1 = IDMT • 2 = IEC_NINV • 3 = IEC_VINV • 4 = IEC_LINV • 5 = IEC_EINV • 6 = ANSI_MINV • 7 = ANSI_VINV • 8 = ANSI_EINV • 9 = Thermal flat • 10 = IT • 11 = I2T • 12 = I4T Default: 0 = INST	Type of method used for the MEprotect relay to respond to the earth leakage level.

EARTH LEAKAGE		
Parameter	**Range**	**Description**
Trip level	30 – 1500 milli Amp (10 milli Amp) Default: 250 milli Amp	Trip level that will activate the alarm or trip flag. Note that above 1500 milli Amp is considered an earth fault.
Trip delay	100 – 1000 milli Sec (50 milli Sec) Default: 100 milli Sec	Time it will take to set the trip flag.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Timed • 3 = Curve Default: 0 = Manual	The method used to reset the earth leakage trip flag.
Reset delay	100 – 2000 milli Sec(50 milli Sec) Default: 1000 milli Sec	Time it will take to reset the earth leakage trip if reset type is selected > 0.
Warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the earth leakage warning flag.
Trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the earth leakage trip flag.

Parameters – IL zero sequence:

IL ZERO SEQUENCE		
Parameter	**Range**	**Description**
Trip type	• 0 = Instantaneous • 1 = IDMT • 2 = IEC_NINV • 3 = IEC_VINV • 4 = IEC_LINV • 5 = IEC_EINV • 6 = ANSI_MINV • 7 = ANSI_VINV • 8 = ANSI_EINV • 9 = Thermal flat • 10 = IT • 11 = I2T • 12 = I4T Default: 0 = INST	Type of method used for the NewFeed relay to respond to the zero sequence level.
Trip level	20 – 100 % (1 %) Default: 60 %	Trip level that will activate the alarm or trip flag.
Trip delay	100 – 1000 milli Sec (50 milli Sec) Default: 100 milli Sec	Time it will take to set the trip flag.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Timed • 3 = Curve Default: 0 = Manual	The method used to reset the I0 zero sequence trip flag.
Reset delay	100 – 2000 milli Sec (50 milli Sec) Default: 1000 milli Sec	Time it will take to reset the I0 zero sequence trip if reset type is selected > 0.
Warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the I0 zero sequence warning flag.

IL ZERO SEQUENCE		
Parameter	**Range**	**Description**
Trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the I0 zero sequence trip flag.

10.15 ANSI 50P – Phase instantaneous over current

Description:

Relay that functions instantaneously on an excessive value of phase to phase current or on an excessive rate of current rise, and phase vector shift, thus indicating a fault in the apparatus or circuit being protected.

Application:

Three-phase protection against overloads and phase-to-phase short-circuits.

Relay that functions instantaneously on an excessive value of current or on an excessive rate of current rise, thus indicating a fault in the apparatus or circuit being protected.

Two level with independent definite time delays.

Very high amplitude, rate of change and phase angle (vector shift) is used to ensure that the fault is a short circuit condition.

This is to eliminate false short circuit trips.

Recommended for trailing cable where the cable can get damage by external factors.

Parameters:

PHASE INSTANTANEOUS OVER CURRENT		
Parameter	**Range**	**Description**
Short circuit HH trip level	600 – 1200 % (1 %) Default: 600%	Load exceed the I>> load level in order to activate the warning or alarm flag. Used for very fast trip condition.
Short circuit HH trip delay	30 – 300 milli Sec (10 milli Sec) Default: 30 milli Sec	Trip delay from that short circuit HH alarm flag was set till the trip flag will be activated.
Short circuit H trip level	200 – 1200 % (1 %) Default: 600%	Load exceed the I> load level in order to activate the warning or alarm flag. Used for sow trip condition.
Short circuit H trip delay	30 – 2500 milli Sec (10 milli Sec) Default: 30 milli Sec	Trip delay from that short circuit HH alarm flag was set till the trip flag will be activated.
Short circuit HH warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.

PHASE INSTANTANEOUS OVER CURRENT		
Parameter	**Range**	**Description**
Short circuit H warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Short circuit HH trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip condition enabled.
Short circuit H trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip condition enabled.

10.16 ANSI 51G – Timed ground instantaneous overcurrent

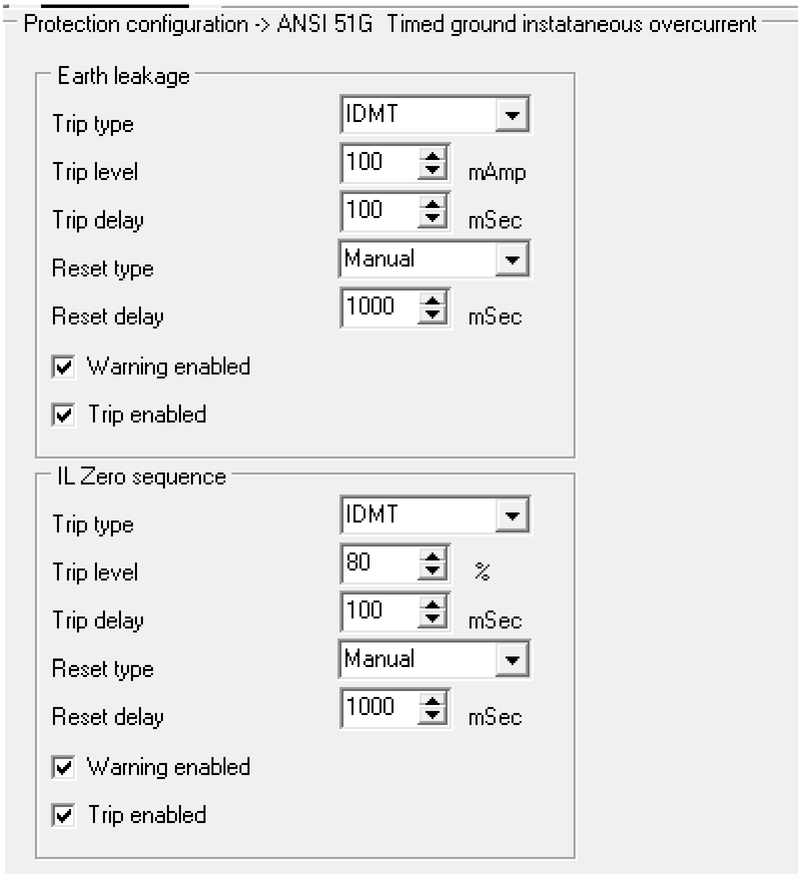
Description:

Detection of phase to ground fault. The NewFeed detects this fault via 2 methods:

- Earth leakage via a CBCT core
- I0 zero sequence component.
    - Zero sequence level % = (IL1[0] + IL2[0] + IL3[0]).

Application:

Used were touch potentials can be hazardous to personnel on site. This can result in the loss of life.



Parameters – Earth leakage:

EARTH LEAKAGE		
Parameter	**Range**	**Description**
Trip type	• 0 = Instantaneous • 1 = IDMT • 2 = IEC_NINV • 3 = IEC_VINV • 4 = IEC_LINV • 5 = IEC_EINV • 6 = ANSI_MINV • 7 = ANSI_VINV • 8 = ANSI_EINV • 9 = Thermal flat • 10 = IT • 11 = I2T • 12 = I4T Default: > 0	Type of method used for the NewFeed relay to respond to the earth leakage level.
Trip level	30 – 1500 mAmp (10 mAmp) Default: 100 mAmp	Trip level that will activate the alarm or trip flag. Note that above 1500 mAmp is considered an earth fault.
Trip delay	100 – 1000 milli Sec(50 milli Sec) Default: 100 milli Sec	Time it will take to set the trip flag.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Timed • 3 = Curve Default: 0 = Manual	The method used to reset the earth leakage trip flag.
Reset delay	100 – 2000 milli Sec(50 milli Sec) Default: 1000 milli Sec	Time it will take to reset the earth leakage trip if reset type is selected > 0.
Warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the earth leakage warning flag.

EARTH LEAKAGE		
Parameter	**Range**	**Description**
Trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the earth leakage trip flag.

Parameters – IL zero sequence:

IL ZERO SEQUENCE		
Parameter	**Range**	**Description**
Trip type	• 0 = Instantaneous • 1 = IDMT • 2 = IEC_NINV • 3 = IEC_VINV • 4 = IEC_LINV • 5 = IEC_EINV • 6 = ANSI_MINV • 7 = ANSI_VINV • 8 = ANSI_EINV • 9 = Thermal flat • 10 = IT • 11 = I2T • 12 = I4T Default: > 0	Type of method used for the NewFeed relay to respond to the zero sequence level.
Trip level	20 – 100 % (1 %) Default: 60 %	Trip level that will activate the alarm or trip flag.
Trip delay	100 – 1000 milli Sec(50 milli Sec) Default: 100 milli Sec	Time it will take to set the trip flag.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Timed • 3 = Curve Default: 0 = Manual	The method used to reset the I0 zero sequence trip flag.
Reset delay	100 – 2000 milli Sec (50 milli Sec) Default: 1000 milli Sec	Time it will take to reset the I0 zero sequence trip if reset type is selected > 0.

IL ZERO SEQUENCE		
Parameter	**Range**	**Description**
Warning enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the I0 zero sequence warning flag.
Trip enabled	• 0 = Disabled • 1 = Enabled Default : 0 = Disabled	Enable the I0 zero sequence trip flag.

10.17 ANSI 51LR – Lock rotor during running

Description:

Protects drives against lock rotors during running conditions.

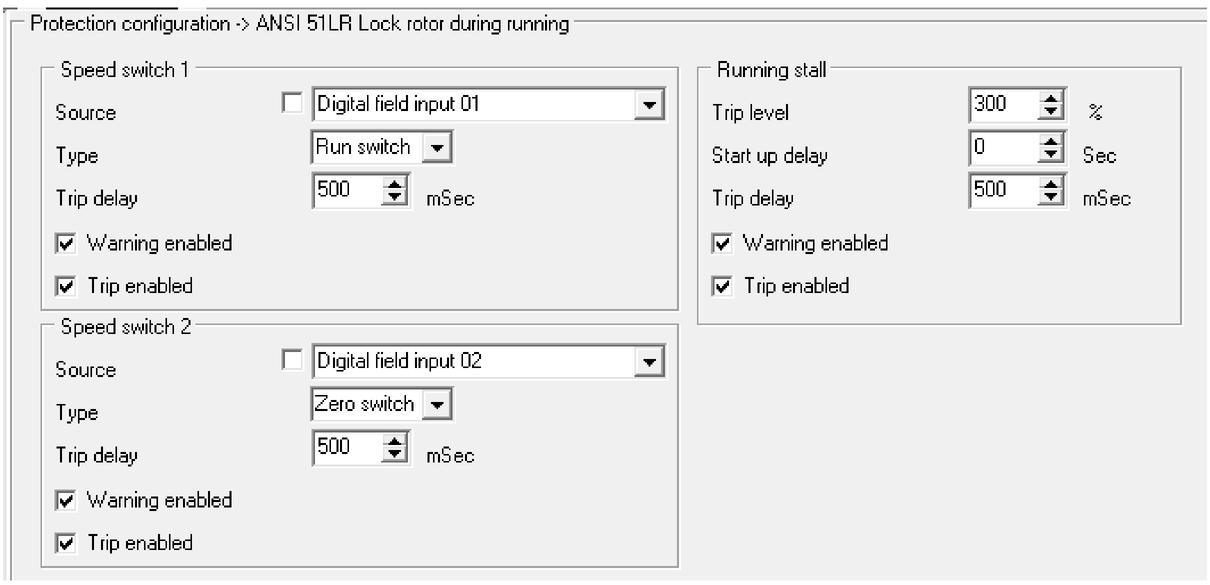
NewFeed allows the following method of protection:

- Running stall
    - Once the motor has successfully run up to speed and timed out the startup delay ANSI 51LR element is armed, should an impact causes the load current to exceed the preset running stall trip level and remain above this level for the preset trip will be tripped on ANSI 51LR and latched out requiring a reset signal. delay the motor.
- Speed switch
    - Zero switch that closes a switch when the rotor is not rotating when supply voltage is applied to the motor terminal the rotor must start rotating and open the switch.
    - Run switch will close when the rotor rotating at a speed greater than 30% rated speed.
    - Switch which is monitor during drive operation and must be in the correct position within the preset trip will be tripped on ANSI 51LR and latched out requiring a reset signal. delay the motor.

Application:

Drive type applications were an obstruction can jam the drive.

- Crusher.
- Conveyer.
- Drum screens.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true).

Parameters – Running stall:

RUNNING STALL		
Parameter	**Range**	**Description**
Running stall trip level	110 – 300 % (1 %) Default: 300 %.	Load current level of MLC setting in percentage to be above to activate the warning or alarm flag.
Running stall start up delay	0 – 200 Sec (0 Sec) Default: 0 Sec.	Start-up time given to the drive to clear debris before arming the running stall protection.
Running stall trip delay	100 – 2000 milli Sec. (10 milli Sec.) Default: 200 milli Secs.	Trip delay from that the running stall alarm flag was set till the trip flag will be activated.
Running warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Running stall trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

Parameters – Speed switch:

SPEED SWITCH		
Parameter	**Range**	**Description**
Speed switch 1 - 2 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Speed switch is typically connected to a digital input.
Speed switch 1 - 2 type.	• 0 = Zero switch • 1 = Run switch Default: 0 = Zero switch	Type of speed switch connected. Zero switch is a switch that is close if the rotor is not turning. Run switch is a switch that closes when the rotor is turning.
Speed switch 1 - 2 trip delay	200 – 65000 ms. (50 ms.) Default: 200 ms.	Trip delay from that the speed switch alarm flag was set till the trip flag will be activated.
Speed switch 1 - 2 warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Speed switch 1 - 2 trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.18 ANSI 51LS – Lock rotor during start up

Description:

Protects drives against lock rotors during start up conditions.

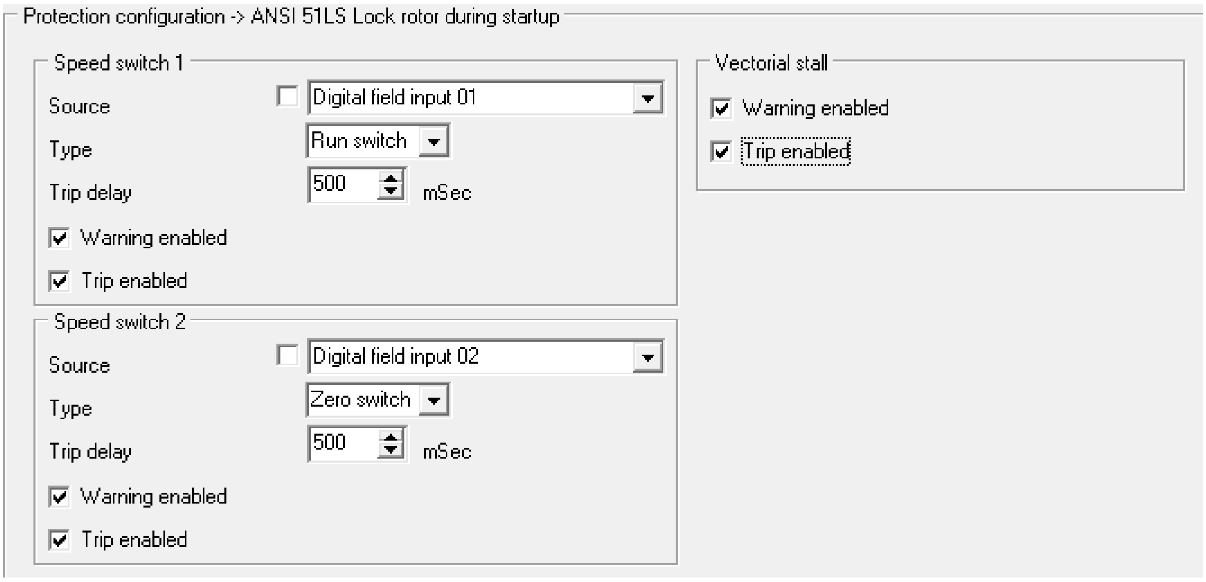
NewFeed allows the following method of protection:

- Vectorial stall (Startup stall)
    - Monitors the rate of change of the power factor level requirement is that power factor must improve during acceleration to speed (Cos Ø curve will follow shape of motor speed torque curve) when motor has insufficient torque to continue acceleration to operational sped the Cos Ø value will remain constant a 3sec delay in this condition is sufficient to accelerate through any normal toque fluctuations that can occur with dual cage or deep bar rotor designs.
    - Also works with the IEC60255-8 curve selection.
    - Power factor must improve within 40% of the time of the thermal curve time selected.
- Speed switch
    - Zero switch that remains closed due to the motor shaft not moving within locked rotor preset switch delay.
    - Run switch that closes when the rotor is moving at a certain speed.
    - Switch is continually monitor during drive operation and must be in the correct position.

Application:

Drive type applications were an obstruction can jam the drive.

- Crusher.
- Conveyer.
- Drum screens.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters – Vectorial stall:

VECTORIAL STALL		
Parameter	**Range**	**Description**
Vectorial stall warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Vectorial stall trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled. Works on 40% of the thermal class selected in the IEC60255-8 curve.

Parameters – Speed switch:

SPEED SWITCH		
Parameter	**Range**	**Description**
Speed switch 1 – 2 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Speed switch is typically connected to a digital input.
Speed switch 1 – 2 type.	• 0 = Zero switch • 1 = Run switch Default: 0 = Zero switch	Type of speed switch connected. Zero switch is a switch that is close if the rotor is not turning. Run switch is a switch that closes when the rotor is turning.
Speed switch 1 – 2 trip delay	200 – 65000 ms. (50 ms.) Default: 200 ms.	Trip delay from that the speed switch alarm flag was set till the trip flag will be activated.
Speed switch 1 – 2 warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Speed switch 1 – 2 trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.19 ANSI 51P – Phase timed over current

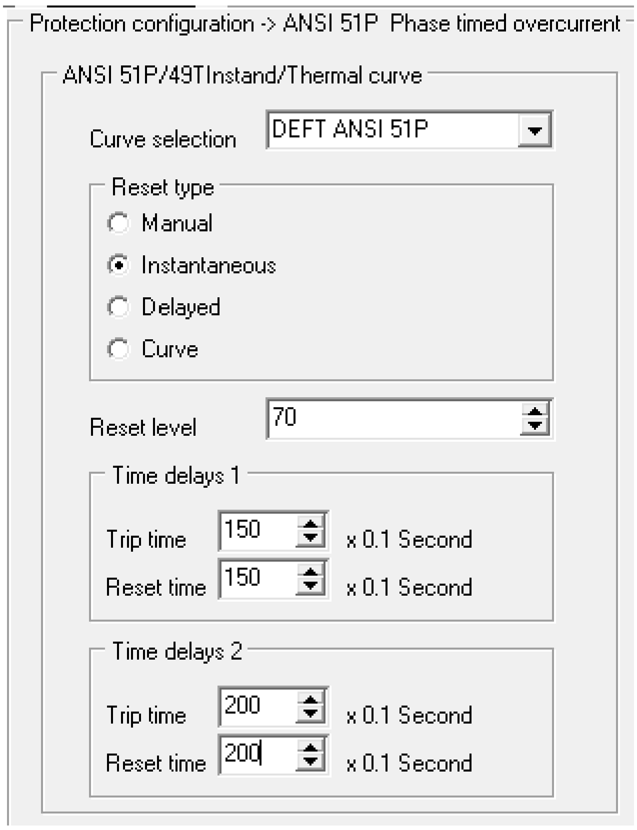
Description:

Protection against thermal damage caused by overloads on machines (transformers, motors or generators). No thermal memory is available for these curves.

ANSI 49 or ANSI 51P will always be enable as overcurrent protection is a must on all devices.

Application:

Any motor or transformer that needs a thermal model calculated to help protect against heat.



Parameters:

PHASE TIMED OVER CURRENT		
Parameter	**Range**	**Description**
Curve selection	• 0 = IEC60255-8 ANSI 49 • 1 = DEFT ANSI 51P • 2 = IEC_NINV ANSI 51P • 3 = IEC_VINV ANSI 51P • 4 = IEC_LINV ANSI 51P • 5 = IEC_EINV ANSI 51P • 6 = ANSI_MINV ANSI 51P • 7 = ANSI_VINV ANSI 51P • 8 = ANSI_EINV ANSI 51P • 9 = Thermal flat ANSI 51P • 10 = IT ANSI 51P • 11 = I2T ANSI 51P • 12 = I4T ANSI 51P Default: 0 = IEC60255-8 ANSI 49.	Different thermal or curve modes are available depending on the device being thermally protected.
Reset type	• 0 = Manual • 1 = Instantaneous • 2 = Delayed • 3 = Curve Default: Curve	Various resets are available but not available to all the curve selections. Manual is available to all the curves and will cause a thermal trip to latch the trip contact. Instantaneous is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Delayed is available to all the curves except IEC60255-8 ANSI 49 as this curve has a thermal memory. Curve is available to all the curves.
Reset level	1 – 99 % (1 %) Default: 70 %	The thermal used reset level. The level must be so that a device can start without using all the capacity.
Time delays 1 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 1.
Time delays 1 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 1.

PHASE TIMED OVER CURRENT		
Parameter	**Range**	**Description**
Time delays 2 trip time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till trip multiplier. This trip time works with MLC setting 2.
Time delays 2 reset time	1 – 30000 x 0.1 Sec (1 x 0.1 Sec) Default: 150 x 0.1 Sec	Selected curves time till reset multiplier. This trip time works with MLC setting 2.

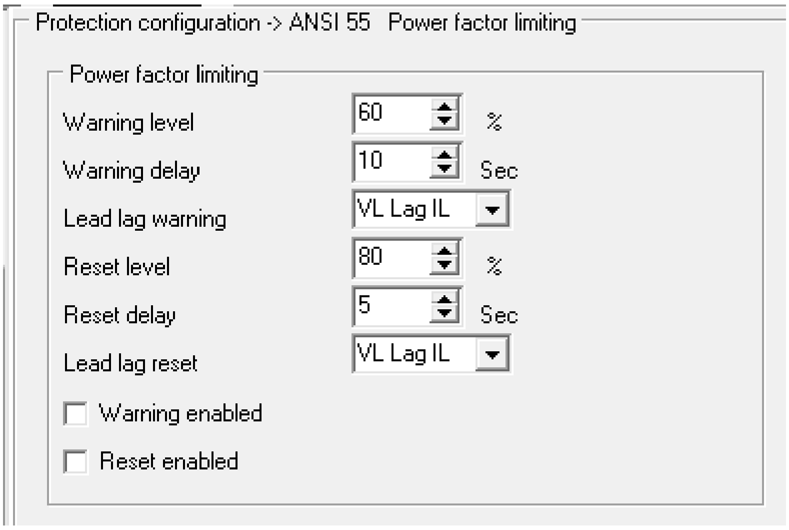
10.20 ANSI 55 – Power factor limiting

Description:

Operates when the power factor in an ac circuit rises above or falls below a predetermined value.

Application:

Backup or primary control of switching in or disconnecting power factor correction capacitor alternatively control excitation of Generator or synchronous motor in applications to help with improving the power factor level to the device.



Parameters:

POWER FACTOR LIMITING		
Parameter	**Range**	**Description**
Power factor limit warning level	1 – 100 % (40 %) Default: 40 %.	Power factor level needed to be below to start the time delay.
Power factor limiting warning delay	0 – 300 Sec (1 Sec) Default: 10 Sec.	Time delay since the power factor level was below the level till the warning flag will be activated.
Power factor limiting lead lag warn	• 0 = VL1 Lag IL1 • 1 = VL1 Lead IL1 Default: 0 = VL1 Lag IL1	Voltage must lead or lag current in order to monitor the power factor level to arm the time delay.
Power factor limiting	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Power factor limit reset warning level	1 – 100 % (40 %) Default: 40 %.	Power factor level needed to be above to start the time delay to reset.
Power factor limiting reset warning delay	0 – 300 Sec (1 Sec) Default: 10 Sec.	Time delay since the power factor level was above the level till the warning flag will be deactivated.
Power factor limiting lead lag reset	• 0 = VL1 Lag IL1 • 1 = VL1 Lead IL1 Default: 0 = VL1 Lag IL1	Voltage must lead or lag current in order to monitor the power factor level to arm the reset time delay.
Power factor limiting auto reset	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Enable the auto reset of the warning flag.

10.21 ANSI 59 – Over voltage

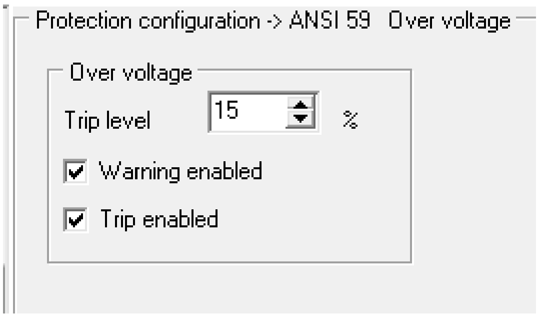
Description:

Detection of abnormally high network voltage or checking for sufficient voltage to enable source transfer. Works with phase-to-phase or phase-to-neutral voltage, each voltage being monitored separately.

Application:

A relay that operates when its input voltage is more than a predetermined value.

When the over voltage condition alarm flag will set the trip flag in 10 seconds.



Parameters:

OVER VOLTAGE		
Parameter	**Range**	**Description**
Trip level	1 – 25 % (1 %) Default: 15 %.	Percentage of the line voltage selection that the line voltage level must be over in order to activate the warning or alarm flag.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

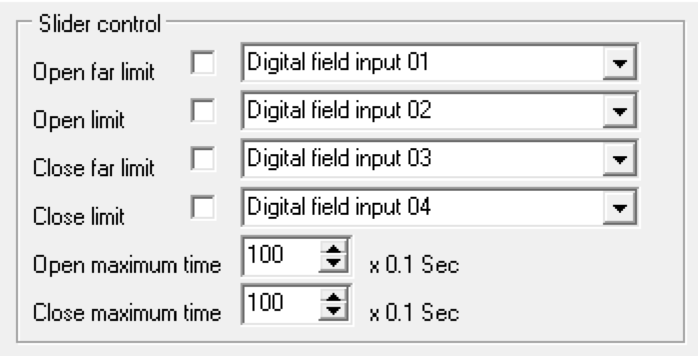
10.22 ANSI 62 – Time-delay stopping or opening

Description:

Time-delay relay that serves in conjunction with the device that initiates the shutdown, stopping, or opening operation in an automatic sequence or protective relay system.

Application:

Were the opening or closing time to travel is very crucial as an overtime could cause mechanical damages. Use of travel limit switches between open and close during normal operation the far limit switches are regarded as overtravel and will lockout the machine operation requiring maintenance staff to investigate the cause of the overtravel.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

TIME-DELAY STOPPING AND OPENING		
Parameter	**Range**	**Description**
Open far limit	0 – 65535 (1) Default: 0.	Non safe open point the device can travel. Zero disables this limit from the check.
Open far	0 – 65535 (1) Default: 0.	Safe open point the device can travel. Zero disables this limit from the check.
Close far limit	0 – 65535 (1) Default: 0.	Non safe close point the device can travel. Zero disables this limit from the check.
Close far	0 – 65535 (1) Default: 0.	Safe open close point the device can travel. Zero disables this limit from the check.
Open maximum time	0 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default: 0 x 0.1 Sec	Maximum time that is needed for the device to travel to the open position. 0 disabled this feature.
Close maximum time	0 – 65000 x 0.1 Sec (1 x 0.1 Sec) Default: 0 x 0.1 Sec	Maximum time that is needed for the device to travel to the close position. 0 disabled this feature.

10.23 ANSI 64 – Insulation lockout

Description:

Detects if the resistance to earth is lower than safe operational value.

Application:

Typical application would be a submersible pump, should the waterproof cable entry fail, and water enters the motor winding chamber or fills the motor. Insulation failure measurement < 20 Kilo Ohm to earth can be used to prevent starting or connecting supply voltage to windings or space heater.

Parameters:

INSULATION LOCKOUT		
Parameter	**Range**	**Description**
Insulation lockout warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Insulation lockout trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.24 ANSI 66 – Notching or jogging / starts per hour

Description:

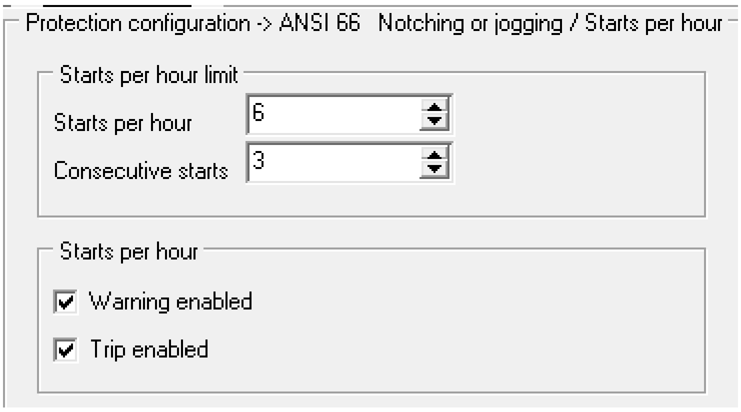
A device that functions to allow only a specified number of operations of a given device or equipment, or a specified number of successive operations within a given time of each other. It is also a device that functions to energize a circuit periodically or for fractions of specified time intervals, or that is used to permit intermittent acceleration or jogging of a machine at low speeds for mechanical positioning.

Application:

Limiting starts to a motor that can take place in an hour.

Consecutive starts will allow an attempt to restart the drive again if the start attempt failed as well as limit the jogging and inching operations to a maximum of 3 attempts.

When one start is left then a 1 start left warning or alarm flag will be activated.



Parameters:

STARTS PER HOUR		
Parameter	**Range**	**Description**
Start per hour	1 – 60 (1) Default: 6.	Amount of starts that can be taken spread out over an hour.
Consecutive starts	1 – 3 (1) Default: 3.	Retry start attempts.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.

STARTS PER HOUR		
Parameter	**Range**	**Description**
Trip enabled	• 0 = Disabled • 1 = Enabled • Default: 0 = Disabled	Alarm condition enabled.

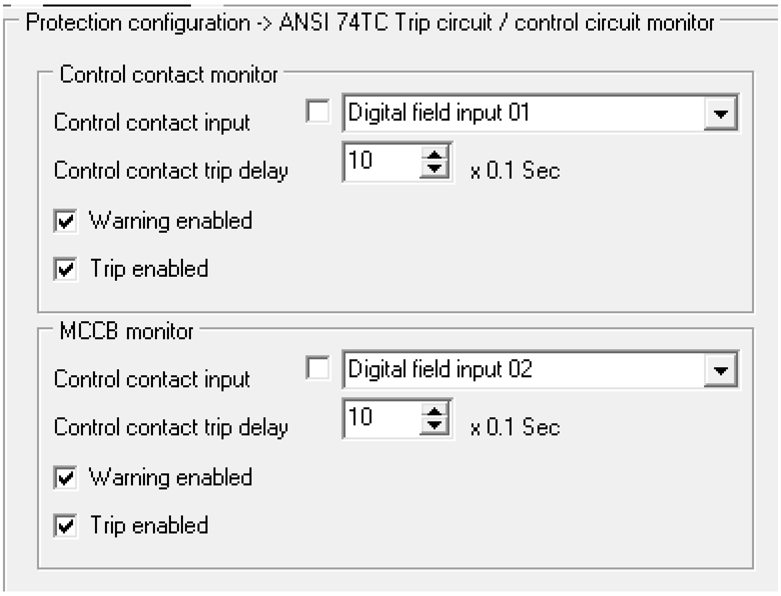
10.25 ANSI 74TC – Trip circuit / control circuit monitor

Description:

Monitors the continuity of the operating coil of the contactor, shunt trip or UV coil of the main breaker to the control supply neutral connection.

Application:

Ensuring that the trip circuit is healthy and will be able to operate, monitors if shunt trip coil has been disconnected or. The expansion IO galvanically isolated input allows for the connecting of the input across the actual trip contact to monitor the entire circuit.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

TRIP CIRCUIT MONITOR		
Parameter	**Range**	**Description**
Main contactor input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Digital input used to detect the neutral connection to the main contractor.
Main contact trip delay	1 – 10 Sec (1 Sec) Default: 1 Sec.	Trip delay from when the main contact alarm flag was set till the trip flag will be activated.
Main contact warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Main contact trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.
MCCB contactor input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Digital input used to detect the neutral connection to the MCCB contactor.
MCCB contact trip delay	1 – 10 Sec (1 Sec) Default: 1 Sec.	Trip delay from when the MCCB contact alarm flag was set till the trip flag will be activated.
MCCB contact warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
MCCB contact trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

10.26 ANSI 77OU – Over and under tele metering

Description:

Uses remote values that comes from a tele metering device to the relay.

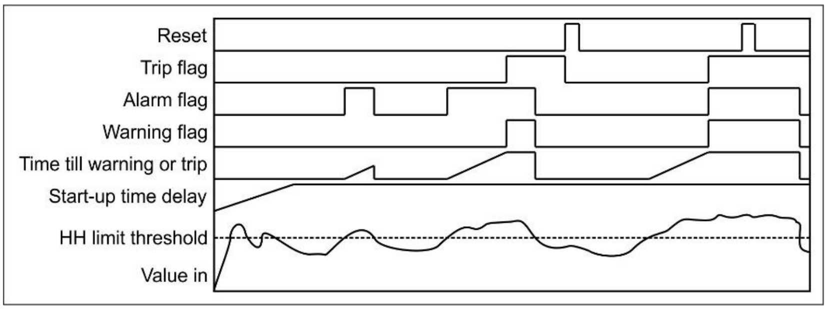
The tele metering values can come into the relay via the internal communication protocol and external communication modules.

The tele metering values come into operation when the tele metering values exceeds the predetermine values.

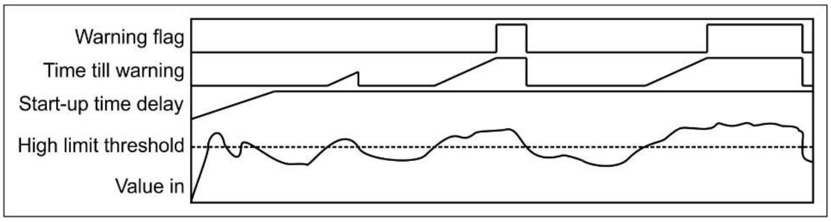
Application:

Were remote device measure values and needs the protection relay to act.

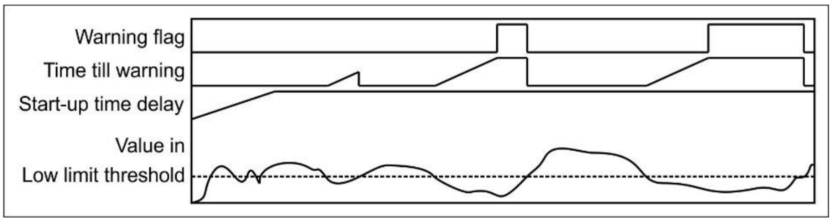
Below is the operation of the ANSI77O high, high protection:



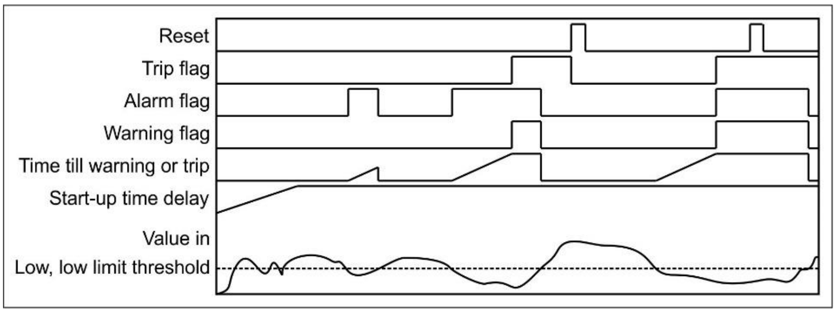
Below is the operation of the ANSI77O high protection:

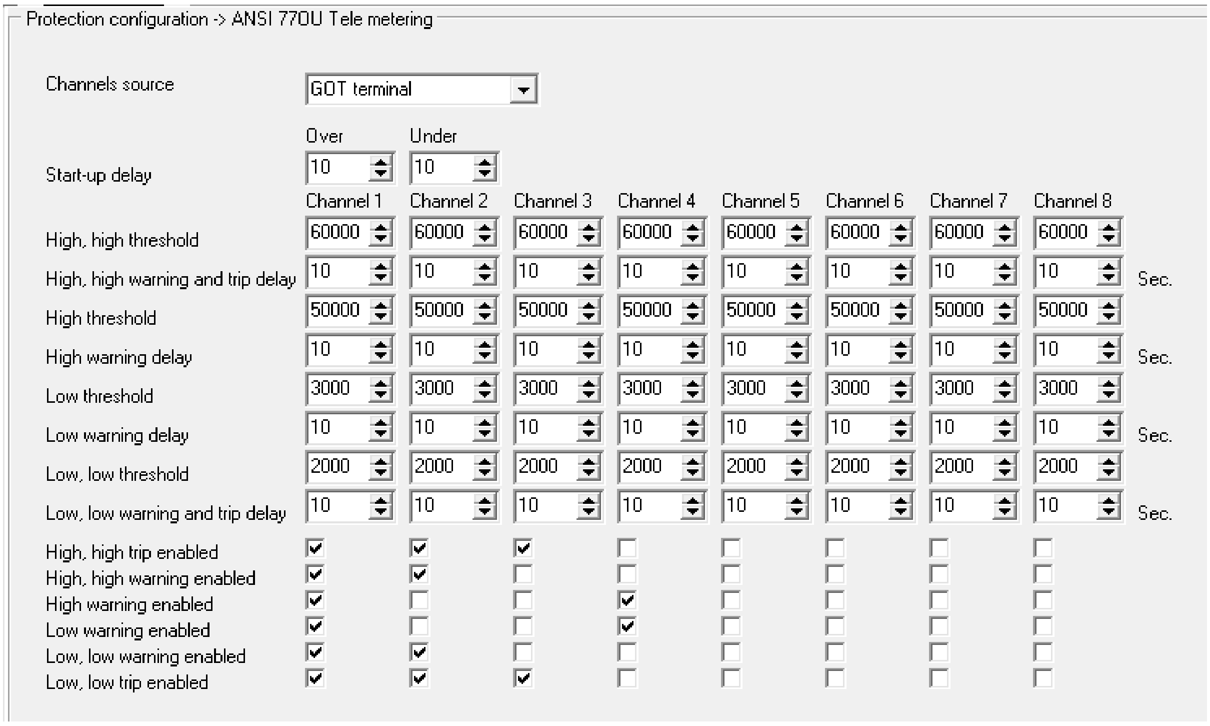


Below is the operation of the ANSI77U low protection:



Below id the operation of the ASNI77U low, low protection:





Parameters:

ANSI77OU General setting		
Parameter	**Range**	**Description**
Channel source	• None. • Internal communication. • External communication. Default: None.	Source of were the tele metering values will come from.

Parameters:

ANSI77O General setting		
Parameter	**Range**	**Description**
Start-up delay	0 – 200 Sec (1 Sec) Default: 10 Sec	Time that all the channels tele metering values will be ignored for ANSI77O.

ANSI77U General setting		
Parameter	**Range**	**Description**
Start-up delay	0 – 200 Sec (1 Sec) Default: 10 Sec	Time that all the channels tele metering values will be ignored for ANSI77U.

ANSI77O high, high tele metering		
Parameter	**Range**	**Description**
High, high threshold.	0 – 65534 (1) Default: 60000	Set level that will activate the alarm flag.
High, high warning and trip delay.	0 – 200 Sec (1 Sec) Default: 10 Sec	Time from that the alarm flag was activate till the trip flag will get set. The warning flag will be active when the tele metering value is above the high, high threshold.
High, high warning enabled.	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
High, high trip enabled.	• 0 = Disabled • 1 = Enabled • Default: 0 = Disabled	Alarm and trip condition enabled.

ANSI77O high tele metering		
Parameter	**Range**	**Description**
High threshold.	0 – 65534 (1) Default: 60000	Set level that will activate the warning flag after the high warning delay expired.
High warning delay.	0 – 200 Sec (1 Sec) Default: 10 Sec	The warning flag will be active when the tele metering value is above the high threshold.
High warning enabled.	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.

ANSI77U low tele metering		
Parameter	**Range**	**Description**
Low threshold.	0 – 65534 (1) Default: 60000	Set level that will activate the warning flag after the low warning delay expired.
Low warning delay.	0 – 200 Sec (1 Sec) Default: 10 Sec	The warning flag will be active when the tele metering value is below the high threshold.
Low warning enabled.	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.

ANSI77U low, low tele metering		
Parameter	**Range**	**Description**
Low, low threshold.	0 – 65534 (1) Default: 60000	Set level that will activate the alarm flag.
Low, low warning and trip delay.	0 – 200 Sec (1 Sec) Default: 10 Sec	Time from that the alarm flag was activate till the trip flag will get set. The warning flag will be active when the tele metering value is below the low, low threshold.
Low, low warning enabled.	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Low, low trip enabled.	• 0 = Disabled • 1 = Enabled • Default: 0 = Disabled	Alarm and trip condition enabled.

10.27 ANSI 81O – Over frequency

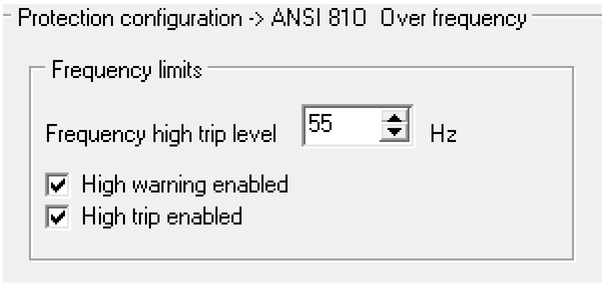
Description:

A relay that responds to the frequency of an electrical quantity, operating when the frequency exceeds the predetermined value.

Application:

Monitoring of the supply frequency allows for pre-emptive control as well as identification of over fluxing and under fluxing of motor and generator windings.

The time to trip is set at 10 seconds after the predetermined value is exceeded.



Parameters:

OVER FREQUENCY		
Parameter	**Range**	**Description**
High trip level	40 – 80 Hz (1 Hz) Default: 55Hz	Set level that will activate the warning or alarm flag. The alarm
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm and trip condition enabled.

10.28 ANSI 81R – Rate of frequency change

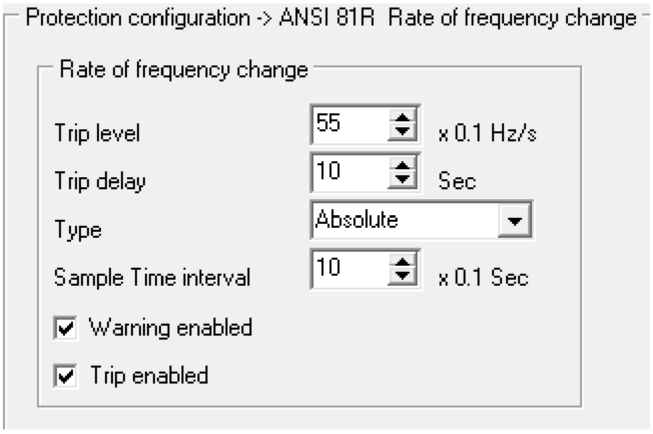
Description:

A relay that responds to the frequency of an electrical quantity, operating when the rate of frequency change is less or exceeds the predetermined value.

This feature can work on the positive, negative or absolute incline of the frequency change. The sample interval of the frequency over time can be changed.

Application:

Stall detection on generator or identification of heavy loading, early indicator to introduce a parallel supply source or another transformer to meet increased load before system becomes unstable increase in rate of change can be due to load sheading or increasing speed of prime mover.



Parameters:

RATE OF FREQUENCY CHANGE		
Parameter	**Range**	**Description**
Trip level	1 – 100 x 0.1 Hz (1 x 0.1 Hz) Default: 55Hz	The predetermined warning or alarm level activation.
Trip delay	1 – 10 Sec (1 Sec) Default: 10 Sec	Time from that the alarm flag was set to latch the trip contactor and activate the trip flag.
Type	• 0 = Positive incline. • 1 = Negative incline. • 2 = Absolute incline. Default: Positive incline.	Rate of frequency sample direction.
Time interval	1 – 100 x 0.1 Sec (1 x 0.1 Sec) Default: 10 x 0.1 Sec	Time interval between two frequency points to detect the difference between.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm and trip condition enabled.

10.29 ANSI 87U - Under frequency

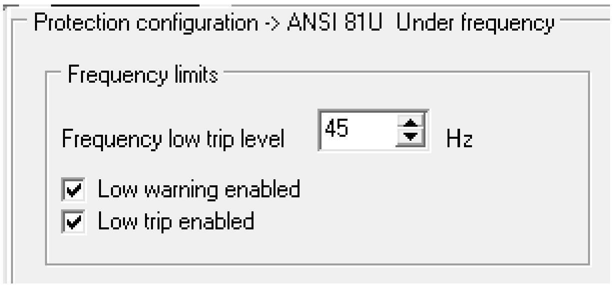
Description:

A relay that responds to the frequency of an electrical quantity, operating when the frequency is less than the predetermined value.

The time to trip is set at 10 seconds after the predetermined value is less.

Application:

Indicates increased loading of generator or under speed on prime mover condition can lead to increased current as well as overloading if the volts / hertz ratio is not maintained ANSI 24.



Parameters:

UNDER FREQUENCY		
Parameter	**Range**	**Description**
High trip level	30 – 60 Hz (1 Hz) Default: 45Hz	Set level that will activate the warning or alarm flag. The alarm
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled • Default: 0 = Disabled	Alarm and trip condition enabled.

10.30 ANSI 86 – Lockout

Description:

An electrically operated hand, or electrically reset relay or device that functions to shut down or hold an equipment out of service, or both, upon the occurrence of abnormal conditions.

Forces the equipment to shut down and be taken out of operation for maintenance or out of service.

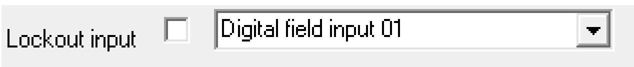
The signal supplied must be and active low signal to protect also against wire breakage.

Trip time is instantaneous.

!!!! WARNING !!!!	
	Lockout is an active low signal. This is to make sure that in the case of a wire breakage that the switch gear remains safe.

Application:

Switchgear application requiring control as well as main circuit isolation as an extra safety measure as well as a second point of isolation control other than the main isolator.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

LOCKOUT		
Parameter	**Range**	**Description**
Lockout input	Logic lookup table for selected input. Default: Zero.	Zero will disable this feature. Signal that indicates that lockout is active.

10.31 ANSI LOP – Voltage loss of power

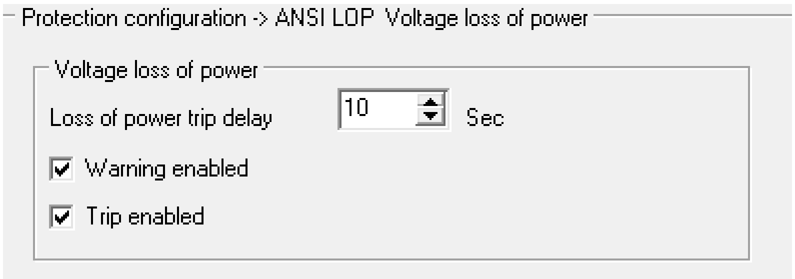
Description:

Monitors the system line voltage. Should any of the phases on the system line voltage drop below the ANSI 27 undervoltage setpoint and not restore before the set trip delay the NewFeed will trip the contactor and latch the fault.

The fault can only be reset once all three phases of the system supply are restored and are above the ANSI 27 undervoltage trip level.

Application:

Feeder breaker application where the three phase system line voltage must be present to drive critical loads or to be used as a signal to switch in an alternative supply to recover power or a severe undervoltage condition that will impact on the stability of the supply network.



Parameters:

VOLTAGE LOSS OF POWER		
Parameter	**Range**	**Description**
Trip delay	1 – 10 Sec (1 Sec) Default: 10 Sec	Time it will take to trip the contactor after alarm flag was active.
Warning enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
Trip enabled	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm and trip condition enabled.

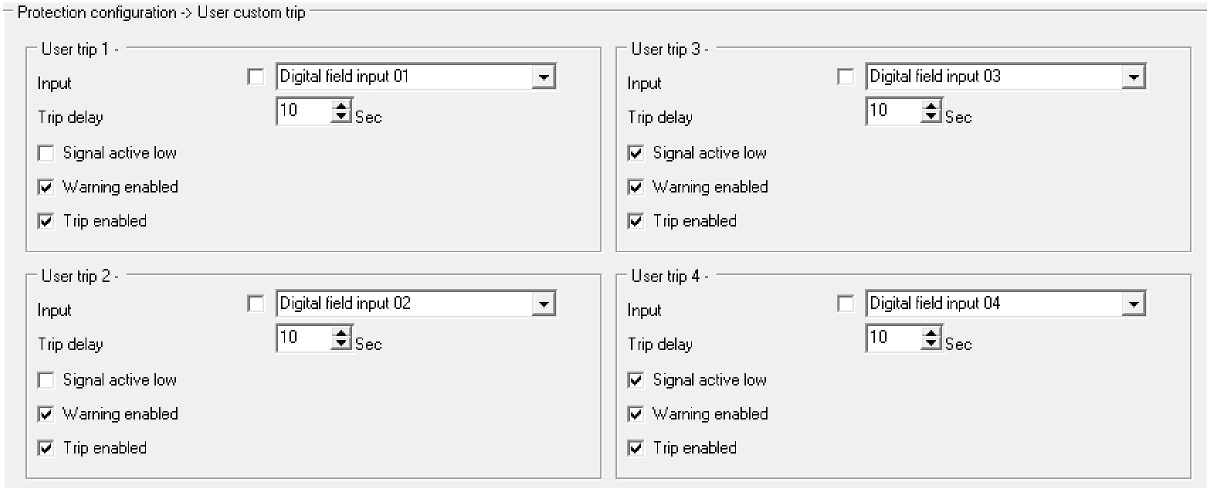
10.32 User custom trip

Description:

Allows 3rd party equipment to be configured into IED to trip breaker with event and fault record time and date stamp as well integration into IED trip and control logic.

Application:

A critical process or protection function not within or related to the IED but allowing the trip to be coordinated and integrated into the IED, typically a vibration sensor or flow meter requiring control or protection intervention.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

USER CUSTOM TRIP		
Parameter	**Range**	**Description**
User trip 1 – 4	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to set the warning flag or start the trip delay timer.
User trip delay 1 – 4	0 – 250 Sec. (1 Sec.) Default: 0 Sec.	Trip delay from that the user trip delay 1 alarm flag was set till the trip flag will be activated.

USER CUSTOM TRIP		
Parameter	**Range**	**Description**
User trip 1 - 4 active low	• 0 = False • 1 = True Default: 0 = False	False, user trip must be high to activate the alarm flag. True, user trip must be low to activate the alarm flag.
User trip 1 – 4 warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
User trip 1 – 4 trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip condition enabled.

10.33 User custom reset mask

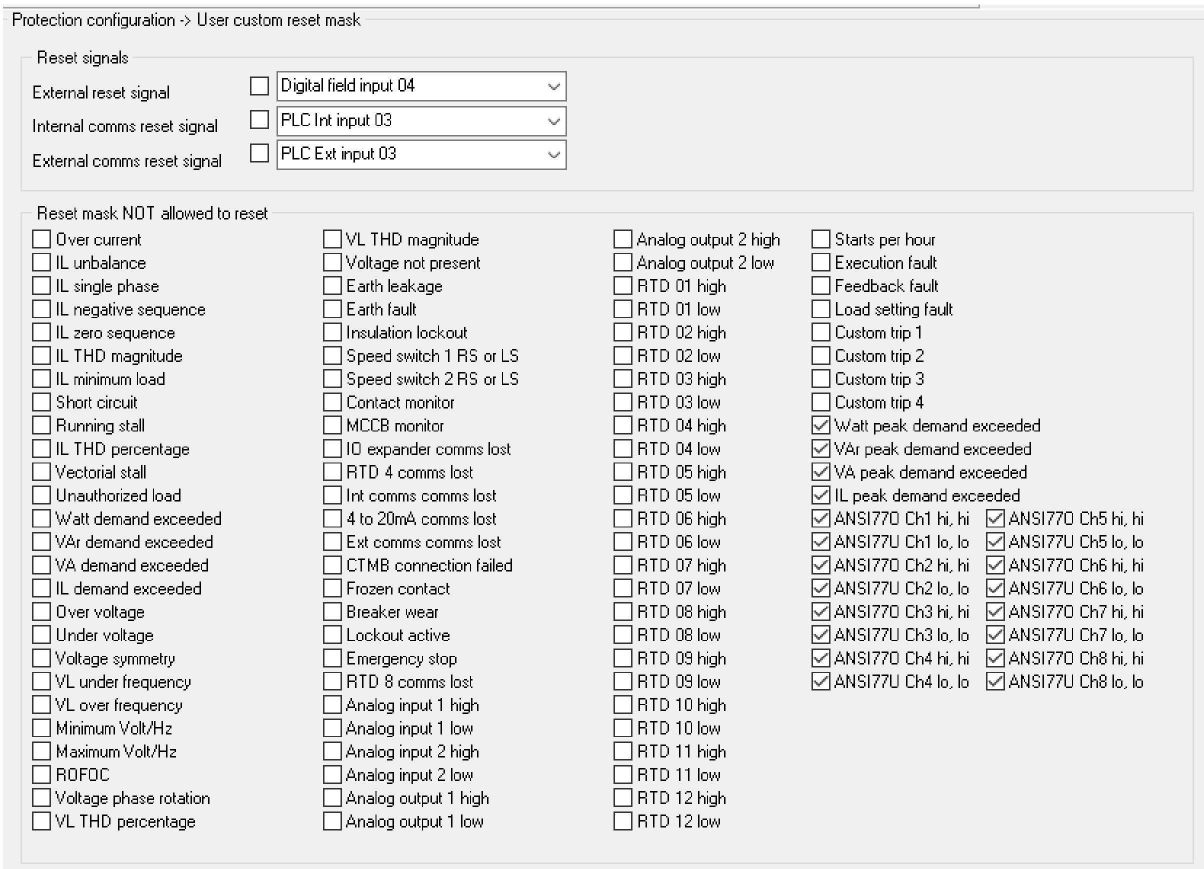
Description:

Used to block reset of faults to occur via extern or SCADA. The feature forces an electric engineer to go to the switch gear to investigate and acknowledge the fault by resetting the NewFeed via the reset button.

All reset will be able to be reset via the reset button located on the front of the control panel.

Application:

Let an engineer investigate insulation faults and not allowing the SCADA operator reset the fault.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

RESET MASK		
Parameter	**Range**	**Description**
External reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used as external reset.
Internal comms reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for internal communication reset.
External comms reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for external communication reset.
CT01 Over current reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an over current trip.
CT01 Current unbalance reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current unbalance trip.
CT01 Single phase reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a single phase trip.
CT01 Current negative sequence reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current negative sequence trip.
CT01 Current zero sequence reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current zero sequence trip.
CT01 Current THD magnitude reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current THD magnitude trip.
CT01 minimum load reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a minimum load trip.
Short circuit reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a short circuit trip.
Running stall reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a running stall trip.

RESET MASK		
Parameter	**Range**	**Description**
CT01 Current THD percentage reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current THD percentage trip.
Vectorial stall reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a vectorial stall trip.
Unauthorized current reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a unauthorized current trip.
Watt demand exceed reset.	• 0 = False • 1 = True Default: 0 = False	Not allow reset a Watt demand exceed trip.
VAr demand exceed reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a VAr demand exceed trip.
VA demand exceed reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a VA demand exceed trip.
Current demand exceed reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a current demand exceed trip.
VT01 Over voltage reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an over voltage trip.
VT01 Under voltage reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a under voltage trip.
VT01 Voltage symmetry reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a voltage symmetry trip.
VT01 Low line frequency reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a low line frequency trip.

RESET MASK		
Parameter	**Range**	**Description**
VT01 High line frequency reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a high line frequency trip.
VT01 Minimum Volt/Hz reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a minimum Volt/Hz trip.
VT01 Maximum Volt/Hz reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a maximum Volt/Hz trip.
VT01 ROFOC reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a ROFOC trip.
Phase rotation reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a phase rotation trip.
VT01 THD percentage reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a voltage THD percentage trip.
VT01 THD magnitude reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a voltage THD magnitude trip.
VT01 Voltage not present reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a voltage not present trip.
Earth leakage reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an earth leakage trip.
Earth fault reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an earth fault trip.
Insulation lockout reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an insulation lockout trip.

RESET MASK		
Parameter	**Range**	**Description**
Speed switch 1 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a speed switch 1 trip.
Speed switch 2 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a speed switch 2 trip.
Contact monitor reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a contact monitor trip.
MCCB monitor reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a MCCB monitor trip.
I/O expander communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an IO expander communication lost trip.
RTD 04 communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a RTD 04 communication lost trip.
Internal communication module, communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an internal communication module, communication lost trip.
4 – 20 mA communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a 4 – 20 mA communication lost trip.
External communication module, communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an external communication module, communication lost trip.
CT and VT connection failed reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a CTMB connection failed trip.
Frozen contact reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a frozen contact trip.

RESET MASK		
Parameter	**Range**	**Description**
Breaker wear reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a breaker wear trip.
Lock out active reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a lock out active trip.
Emergency stop reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an emergency stop trip.
RTD 08 module communication lost reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset RTD 08 communication lost trip.
Analogue input 1 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue input 1 high trip.
Analogue input 1 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue input 1 low trip.
Analogue input 2 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue input 2 high trip.
Analogue input 2 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue input 2 low trip.
Analogue output 1 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue output 1 high trip.
Analogue output 1 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue output 1 low trip.
Analogue output 2 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue output 2 high trip.

RESET MASK		
Parameter	**Range**	**Description**
Analogue output 2 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an analogue output 2 low trip.
RTD 01 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 01 high trip.
RTD 01 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 01 low trip.
RTD 02 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 02 high trip.
RTD 02 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 02 low trip.
RTD 03 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 03 high trip.
RTD 03 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 03 low trip.
RTD 04 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 04 high trip.
RTD 04 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 04 low trip.
RTD 05 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 05 high trip.
RTD 05 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 05 low trip.

RESET MASK		
Parameter	**Range**	**Description**
RTD 06 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 06 high trip.
RTD 06 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 06 low trip.
RTD 07 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 07 high trip.
RTD 07 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 07 low trip.
RTD 08 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 08 high trip.
RTD 08 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 08 low trip.
RTD 09 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 09 high trip.
RTD 09 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 09 low trip.
RTD 10 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 10 high trip.
RTD 10 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 10 low trip.
RTD 11 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 11 high trip.

RESET MASK		
Parameter	**Range**	**Description**
RTD 11 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 11 low trip.
RTD 12 high reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 12 high trip.
RTD 12 low reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an RTD 12 low trip.
Starts per hour reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a starts per hour trip.
Execution fault reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset an execution fault trip.
Feedback fault reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a feedback fault trip.
Load settings fault reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a load settings fault trip.
User trip 1 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a user trip 1 trip.
User trip 2 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a user trip 2 trip.
User trip 3 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a user trip 3 trip.
User trip 4 reset	• 0 = False • 1 = True Default: 0 = False	Not allow reset a user trip 4 trip.

RESET MASK		
Parameter	**Range**	**Description**
Watt peak demand exceed reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a watt peak demand exceed trip.
VAr peak demand exceed reset.	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a VAr peak demand exceed trip.
VA peak demand exceed reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a VA peak demand exceed trip.
IL peak demand exceed reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a IL peak demand exceed trip.
ANSI 77O Ch1 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch1 high, high trip.
ANSI 77U Ch1 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch1 low, low trip.
ANSI 77O Ch2 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch2 high, high trip.
ANSI 77U Ch2 low, low reset	• 0 = False • 1 = True 11 Default: 0 = False	Not allow reset a ANSI 77U Ch2 low, low trip.
ANSI 77O Ch3 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch3 high, high trip.
ANSI 77U Ch3 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch3 low, low trip.
ANSI 77O Ch4 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch4 high, high trip.
ANSI 77U Ch4 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch4 low, low trip.
ANSI 77O Ch5 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch5 high, high trip.

RESET MASK		
Parameter	**Range**	**Description**
ANSI 77U Ch5 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch5 low, low trip.
ANSI 77O Ch6 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch6 high, high trip.
ANSI 77U Ch6 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch6 low, low trip.
ANSI 77O Ch7 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch7 high, high trip.
ANSI 77U Ch7 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch7 low, low trip.
ANSI 77O Ch8 high, high reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77O Ch8 high, high trip.
ANSI 77U Ch8 low, low reset	• 0 = False • 1 = True • Default: 0 = False	Not allow reset a ANSI 77U Ch8 low, low trip.

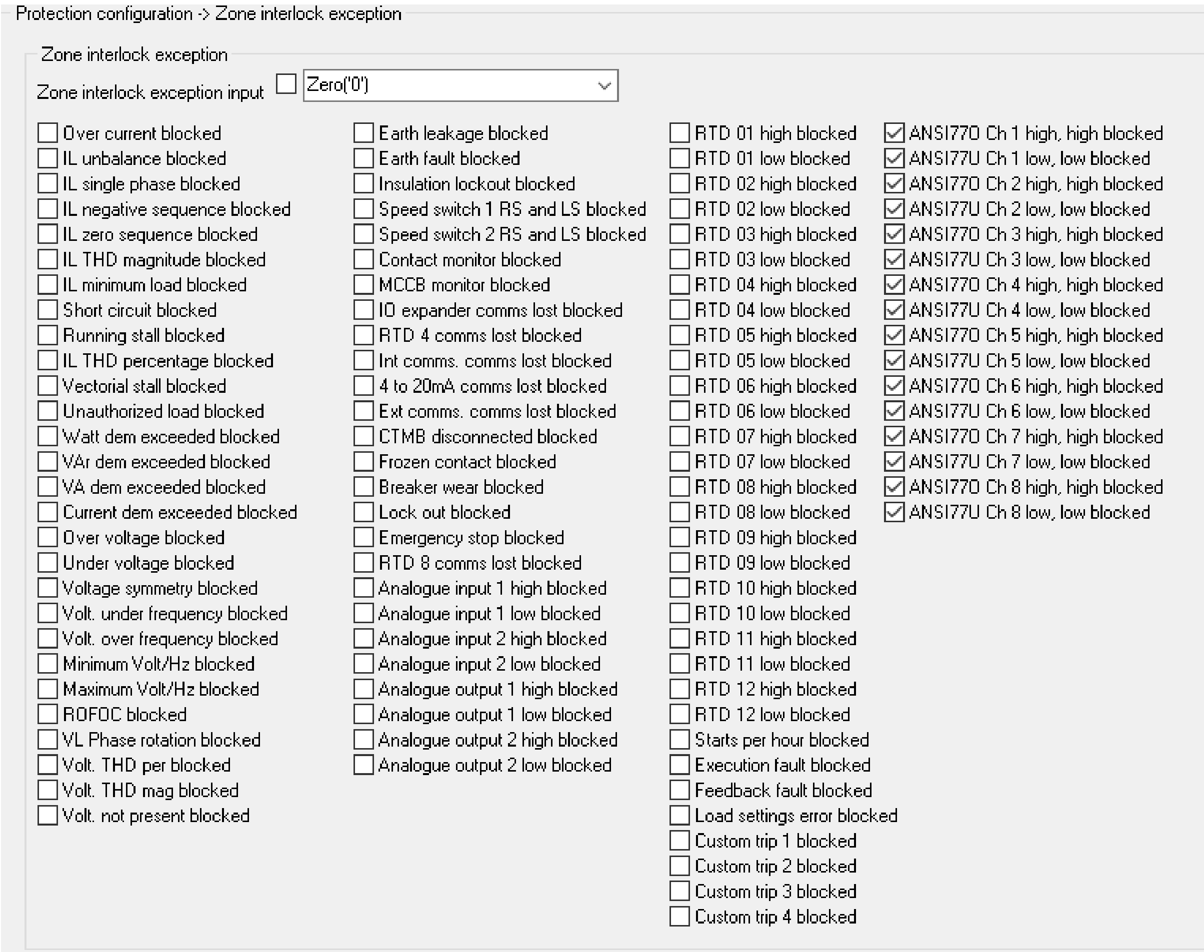
11.1 Zone interlock exception

Description:

Removes the IED trip block operation from selected function. Traditionally and default will be that all protection features are blocked or prevented from operating if zone exception interlock signal is active.

Application:

Normal block operation signals would relate to high energy faults and specifically to maintain grading margins and supply stability, protection functions from which the zone interlock exception can be removed would relate solely to the connected device, unless the function being performed is critical to the process and that failure of the device is of less importance than the maintain of the process.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true).

Parameters:

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
Exception input	Logic lookup table for selected input. Default: Zero.	Input that will activate the zone protection.
CT01 Over current blocked	• 0 = False • 1 = True Default: 0 = False	Block an over current trip.
CT01 Current unbalance blocked	• 0 = False • 1 = True Default: 0 = False	Block a current unbalance trip.
CT01 Single phase blocked	• 0 = False • 1 = True Default: 0 = False	Block a single phase trip.
CT01 Current negative sequence blocked	• 0 = False • 1 = True Default: 0 = False	Block a current negative sequence trip.
CT01 Current zero sequence blocked	• 0 = False • 1 = True Default: 0 = False	Block a current zero sequence trip.
CT01 Current THD magnitude blocked	• 0 = False • 1 = True Default: 0 = False	Block a current THD magnitude trip.
CT01 minimum load blocked	• 0 = False • 1 = True Default: 0 = False	Block a minimum load trip.
Short circuit blocked	• 0 = False • 1 = True Default: 0 = False	Block a short circuit trip.
Running stall blocked	• 0 = False • 1 = True Default: 0 = False	Block a running stall trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
CT01 Current THD percentage blocked	• 0 = False • 1 = True Default: 0 = False	Block a current THD percentage trip.
Vectorial stall blocked	• 0 = False • 1 = True Default: 0 = False	Block a vectorial stall trip.
Unauthorized current blocked	• 0 = False • 1 = True Default: 0 = False	Block an unauthorized current trip.
Watt demand exceed blocked.	• 0 = False • 1 = True Default: 0 = False	Block a Watt demand exceed trip.
VAr demand exceed blocked	• 0 = False • 1 = True Default: 0 = False	Block a VAr demand exceed trip.
VA demand exceed blocked	• 0 = False • 1 = True Default: 0 = False	Block a VA demand exceed trip.
Current demand exceed blocked	• 0 = False • 1 = True Default: 0 = False	Block a current demand exceed trip.
VT01 Over voltage blocked	• 0 = False • 1 = True Default: 0 = False	Block an over voltage trip.
VT01 Under voltage blocked	• 0 = False • 1 = True Default: 0 = False	Block a under voltage trip.
VT01 Voltage symmetry blocked	• 0 = False • 1 = True Default: 0 = False	Block a voltage symmetry trip.
VT01 Low line frequency blocked	• 0 = False • 1 = True Default: 0 = False	Block a low line frequency trip.
VT01 High line frequency blocked	• 0 = False • 1 = True Default: 0 = False	Block a high line frequency trip.
VT01 Minimum Volt/Hz blocked	• 0 = False • 1 = True Default: 0 = False	Block a minimum Volt/Hz trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
VT01 Maximum Volt/Hz blocked	• 0 = False • 1 = True Default: 0 = False	Block a maximum Volt/Hz trip.
VT01 ROFOC blocked	• 0 = False • 1 = True Default: 0 = False	Block a ROFOC trip.
Phase rotation blocked	• 0 = False • 1 = True Default: 0 = False	Block a phase rotation trip.
VT01 THD percentage blocked	• 0 = False • 1 = True Default: 0 = False	Block a voltage THD percentage trip.
VT01 THD magnitude blocked	• 0 = False • 1 = True Default: 0 = False	Block a voltage THD magnitude trip.
VT01 Voltage not blocked reset	• 0 = False • 1 = True Default: 0 = False	Block a voltage not present trip.
Earth leakage blocked	• 0 = False • 1 = True Default: 0 = False	Block an earth leakage trip.
Earth fault blocked	• 0 = False • 1 = True Default: 0 = False	Block an earth fault trip.
Insulation lockout blocked	• 0 = False • 1 = True Default: 0 = False	Block an insulation lockout trip.
Speed switch 1 blocked	• 0 = False • 1 = True Default: 0 = False	Block a speed switch 1 trip.
Speed switch 2 blocked	• 0 = False • 1 = True Default: 0 = False	Block a speed switch 2 trip.
Contact monitor blocked	• 0 = False • 1 = True Default: 0 = False	Block a contact monitor trip.
MCCB monitor blocked	• 0 = False • 1 = True Default: 0 = False	Block a MCCB monitor trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
I/O expander communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block an IO expander communication lost trip.
RTD 04 communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block a RTD 04 communication lost trip.
Internal communication module, communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block an internal communication module, communication lost trip.
4 – 20 mA communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block a 4 – 20 mA communication lost trip.
External communication module, communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block an external communication module, communication lost trip.
CT and VT connection failed blocked	• 0 = False • 1 = True Default: 0 = False	Block a CTMB connection failed trip.
Frozen contact blocked	• 0 = False • 1 = True Default: 0 = False	Block a frozen contact trip.
Breaker wear blocked	• 0 = False • 1 = True Default: 0 = False	Block a breaker wear trip.
Lock out active blocked	• 0 = False • 1 = True Default: 0 = False	Block a lock out active trip.
Emergency stop blocked	• 0 = False • 1 = True Default: 0 = False	Block an emergency stop trip.
RTD 08 module communication lost blocked	• 0 = False • 1 = True Default: 0 = False	Block a RTD 08 communication lost trip.
Analogue input 1 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue input 1 high trip.
Analogue input 1 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue input 1 low trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
Analogue input 2 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue input 2 high trip.
Analogue input 2 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue input 2 low trip.
Analogue output 1 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue output 1 high trip.
Analogue output 1 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue output 1 low trip.
Analogue output 2 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue output 2 high trip.
Analogue output 2 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an analogue output 2 low trip.
RTD 01 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 01 high trip.
RTD 01 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 01 low trip.
RTD 02 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 02 high trip.
RTD 02 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 02 low trip.
RTD 03 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 03 high trip.
RTD 03 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 03 low trip.
RTD 04 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 04 high trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
RTD 04 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 04 low trip.
RTD 05 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 05 high trip.
RTD 05 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 05 low trip.
RTD 06 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 06 high trip.
RTD 06 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 06 low trip.
RTD 07 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 07 high trip.
RTD 07 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 07 low trip.
RTD 08 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 08 high trip.
RTD 08 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 08 low trip.
RTD 09 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 09 high trip.
RTD 09 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 09 low trip.
RTD 10 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 10 high trip.
RTD 10 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 10 low trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
RTD 11 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 11 high trip.
RTD 11 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 11 low trip.
RTD 12 high blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 12 high trip.
RTD 12 low blocked	• 0 = False • 1 = True Default: 0 = False	Block an RTD 12 low trip.
Starts per hour blocked	• 0 = False • 1 = True Default: 0 = False	Block a starts per hour trip.
Execution fault blocked	• 0 = False • 1 = True Default: 0 = False	Block an execution fault trip.
Feedback fault blocked	• 0 = False • 1 = True Default: 0 = False	Block a feedback fault trip.
Load settings fault blocked	• 0 = False • 1 = True Default: 0 = False	Block a load settings fault trip.
User trip 1 blocked	• 0 = False • 1 = True Default: 0 = False	Block a user trip 1 trip.
User trip 2 blocked	• 0 = False • 1 = True Default: 0 = False	Block a user trip 2 trip.
User trip 3 blocked	• 0 = False • 1 = True Default: 0 = False	Block a user trip 3 trip.
User trip 4 blocked	• 0 = False • 1 = True Default: 0 = False	Block a user trip 4 trip.
ANSI77O Ch1 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch1 high, high trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
ANSI77U Ch1 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch1 low, low trip.
ANSI77O Ch2 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch2 high, high trip.
ANSI77U Ch2 low, low blocked	• 0 = False • 1 = True 12 Default: 0 = False	Block a ANSI77U Ch2 low, low trip.
ANSI77O Ch3 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch3 high, high trip.
ANSI77U Ch3 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch3 low, low trip.
ANSI77O Ch4 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch4 high, high trip.
ANSI77U Ch4 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch4 low, low trip.
ANSI77O Ch5 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch5 high, high trip.
ANSI77U Ch5 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch5 low, low trip.
ANSI77O Ch6 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch6 high, high trip.
ANSI77U Ch6 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch6 low, low trip.
ANSI77O Ch7 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch7 high, high trip.
ANSI77U Ch7 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch7 low, low trip.

ZONE INTERLOCK EXCEPTION		
Parameter	**Range**	**Description**
ANSI77O Ch8 high, high blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77O Ch8 high, high trip.
ANSI77U Ch8 low, low blocked	• 0 = False • 1 = True • Default: 0 = False	Block a ANSI77U Ch8 low, low trip.

12.1 THD protection

Description:

Harmonic current and voltage measurements and monitoring from 1st up to 9th harmonic with warning, alarm and trip settings of allowable individual harmonic levels, as well as the calculation of the THD value in the load current and supply voltage makes for a powerful analytical tool.

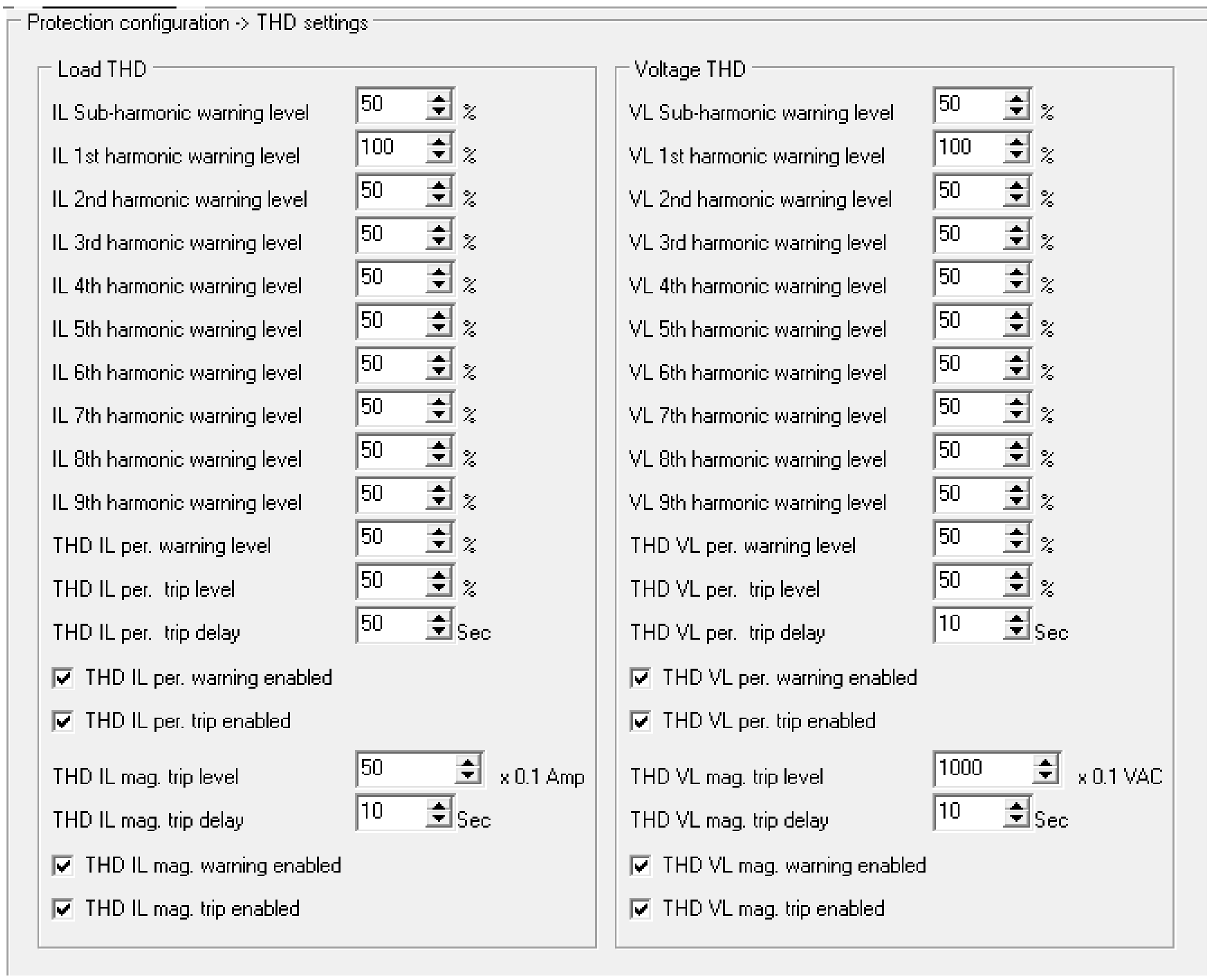
Application:

Protection of windings, as well as prevention of eddy currents in transformer, motor and generator laminated iron cores as well as structural steel on different devices resulting in localised hot spots as well as overheating.

Individual harmonic level warning flags are used on the current and voltage to indicate if a specific harmonic has gone over the fundamental warning level.

THD for percentage current and voltage maximum levels with warning, alarm and trip delay flag activation.

THD magnitude for voltage and current as actual value with warning, alarm and trip delay flag activation.



Parameters:

THD PROTECTION		
Parameter	**Range**	**Description**
Fund current 00 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 0 must go above this level to activate the fundamental current 0 warning flag.
Fund current 01 warning level	0 – 100 % (1 %) Default: 100 %.	Fundamental current 1 must go above this level to activate the fundamental current 1 warning flag.
Fund current 02 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 2 must go above this level to activate the fundamental current 2 warning flag.
Fund current 03 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 3 must go above this level to activate the fundamental current 3 warning flag.
Fund current 04 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 4 must go above this level to activate the fundamental current 4 warning flag.
Fund current 05 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 5 must go above this level to activate the fundamental current 5 warning flag.
Fund current 06 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 6 must go above this level to activate the fundamental current 6 warning flag.
Fund current 07 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 7 must go above this level to activate the fundamental current 7 warning flag.
Fund current 08 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 8 must go above this level to activate the fundamental current 8 warning flag.
Fund current 09 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental current 9 must go above this level to activate the fundamental current 9 warning flag.

THD PROTECTION		
Parameter	**Range**	**Description**
THD current percentage warning level	0 – 100 % (1 %) Default: 50 %.	THD fundamental level must go over this value to activate the warning flag.
THD current percentage trip level	0 – 100 % (1 %) Default: 50 %.	THD fundamental level must go over this value to activate the alarm flag.
THD current trip delay	0 – 3600 Sec (1 Sec) Default: 10 Sec.	Trip delay from when the THD current percentage level alarm flag was set till the trip flag will be activated.
THD current percentage warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
THD current percentage trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.
THD current magnitude trip level	1 – 65000 A (1 A) • Default: 10 A.	THD fundamental level must go over this value to activate the alarm flag.
THD current magnitude trip delay	0 – 3600 Sec (1 Sec) Default: 10 Sec.	Trip delay from when the THD current percentage level alarm flag was set till the trip flag will be activated.
THD current magnitude warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
THD current magnitude trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.
Fund voltage 00 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 0 must go above this level to activate the fundamental current 0 warning flag.

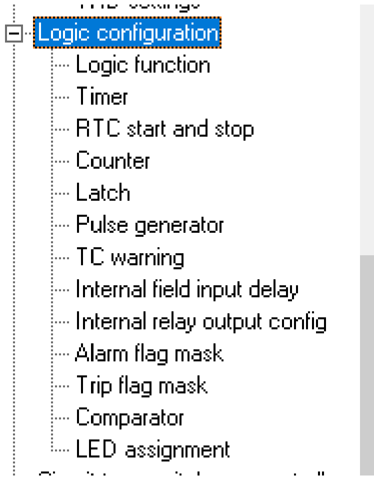
THD PROTECTION		
Parameter	**Range**	**Description**
Fund voltage 01 warning level	0 – 100 % (1 %) Default: 100 %.	Fundamental voltage 1 must go above this level to activate the fundamental current 1 warning flag.
Fund voltage 02 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 2 must go above this level to activate the fundamental current 2 warning flag.
Fund voltage 03 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 3 must go above this level to activate the fundamental current 3 warning flag.
Fund voltage 04 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 4 must go above this level to activate the fundamental current 4 warning flag.
Fund voltage 05 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 5 must go above this level to activate the fundamental current 5 warning flag.
Fund voltage 06 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 6 must go above this level to activate the fundamental current 6 warning flag.
Fund voltage 07 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 7 must go above this level to activate the fundamental current 7 warning flag.
Fund voltage 08 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 8 must go above this level to activate the fundamental current 8 warning flag.
Fund voltage 09 warning level	0 – 100 % (1 %) Default: 50 %.	Fundamental voltage 9 must go above this level to activate the fundamental current 9 warning flag.
THD voltage percentage warning level	0 – 100 % (1 %) Default: 50 %.	THD fundamental level must go over this value to activate the warning flag.

THD PROTECTION		
Parameter	**Range**	**Description**
THD voltage percentage trip level	0 – 100 % (1 %) Default: 50 %.	THD fundamental level must go over this value to activate the alarm flag.
THD voltage trip delay	0 – 3600 Sec (1 Sec) Default: 10 Sec.	Trip delay from when the THD voltage percentage level alarm flag was set till the trip flag will be activated.
THD voltage percentage warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
THD voltage percentage trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.
THD voltage magnitude trip level	1 – 65000 V (1 V) Default: 50 V.	THD fundamental level must go over this value to activate the alarm flag.
THD voltage magnitude trip delay	0 – 3600 Sec (1 Sec) Default: 10 Sec.	Trip delay from when the THD voltage percentage level alarm flag was set till the trip flag will be activated.
THD voltage magnitude warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning condition enabled.
THD voltage magnitude trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Alarm condition enabled.

13 LOGIC FEATURES

Custom defined logic that can allow more complex functionality of the NewFeed. Allowing custom configuration of the NewFeed control over the output relays.

Each logic will be discussed under their own section.



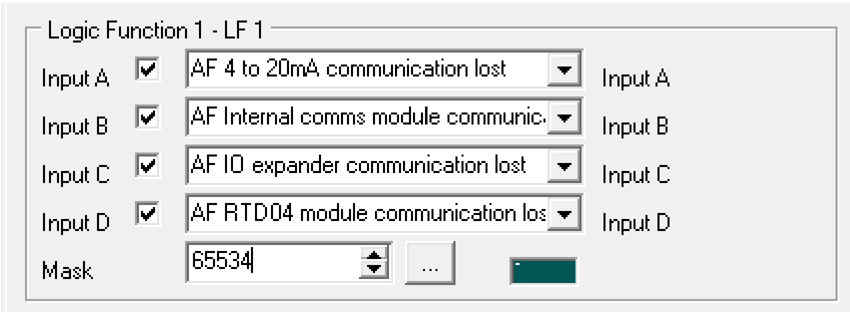
13.1 Logic function

Description:

6 x Logic functions are used to create desired functions, to integrate into the total Control of the protected drive, transformer, feeder etc. Logic Functions are used to create complex logic for the NewFeed relay to execute.

All 6 table consist of 4 inputs and 1 Logic Function Output is used to setup the logic in the logic table.

Application:



Logic Function

D	C	B	A	Op
0	0	0	0	0
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Ok Cancel

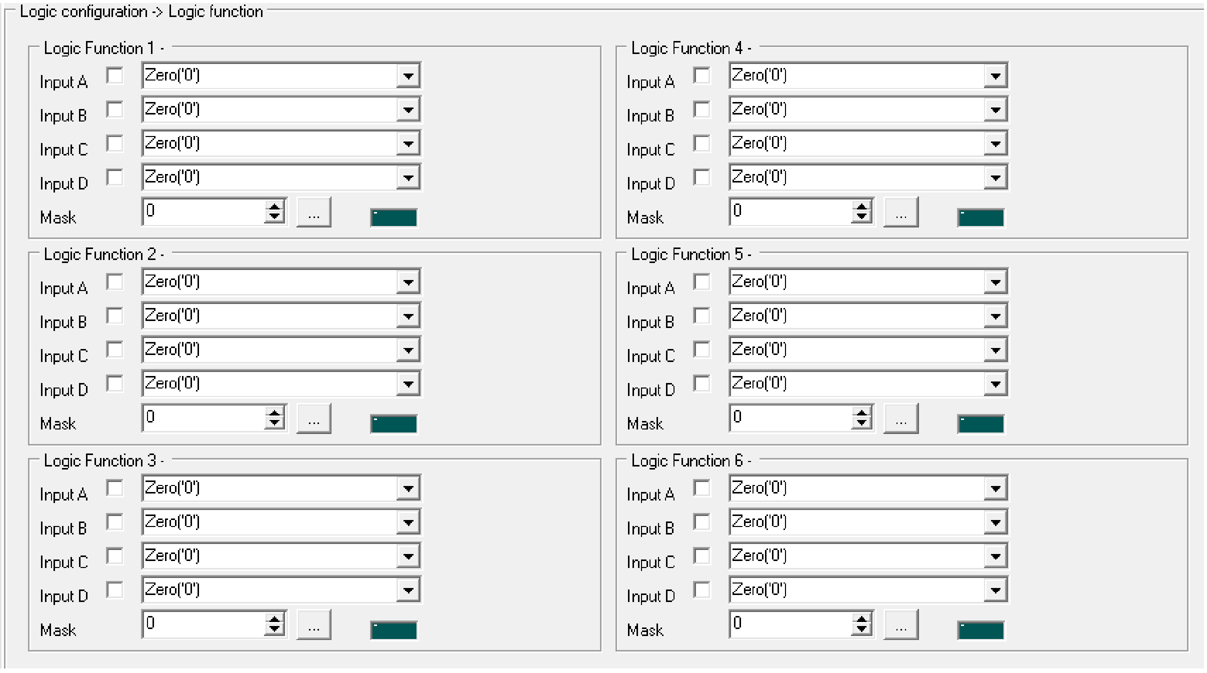
From the Logic Function table on the right, various combinations can be used to form OR, AND, XOR outputs.

As shown above currently the output of logic table 3 will only go high when all Inputs ABC and D are high.

This is an OR function.

As taken from the above Logic Function Table,

it means if any of the 4-20 mA, Internal I2C, DIO or RTD04 module has a communications Alarm Flag (AF) then LF 1 output becomes 1 or is set.



NOTE ON FLAG INPUT SELECTION BOX

Checkbox in front of input signal means that signal will be inverted

(True = false and False = true).

Parameters:

Logic function		
Parameter	**Range**	**Description**
Logic function mask 01	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 01 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 01 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 01 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 01 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.
Logic function mask 02	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 02 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 02 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 02 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 02 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.
Logic function mask 03	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 03 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 03 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 03 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 03 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.

Logic function		
Parameter	**Range**	**Description**
Logic function mask 04	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 04 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 04 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 04 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 04 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.
Logic function mask 05	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 05 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 05 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 05 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 05 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.
Logic function mask 06	0 – 65535 (1) Default: 0.	Masked sum of the logic.
Logic function 06 Input A	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input A.
Logic function 06 Input B	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input B.
Logic function 06 Input C	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input C.
Logic function 06 Input D	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used for input D.

13.2 Timers

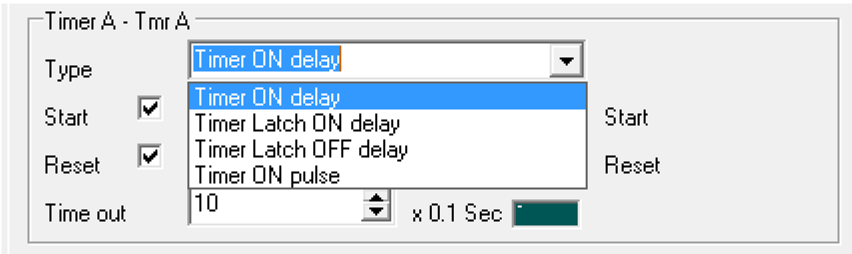
Description:

There are two Timers (A&B) available on each NewFeed relay. Each timer has a start input that will start the timer count, before enabling the Timer Output. Reset input is used to reset the condition of the timer.

Timeout will be length of the selected timer function.

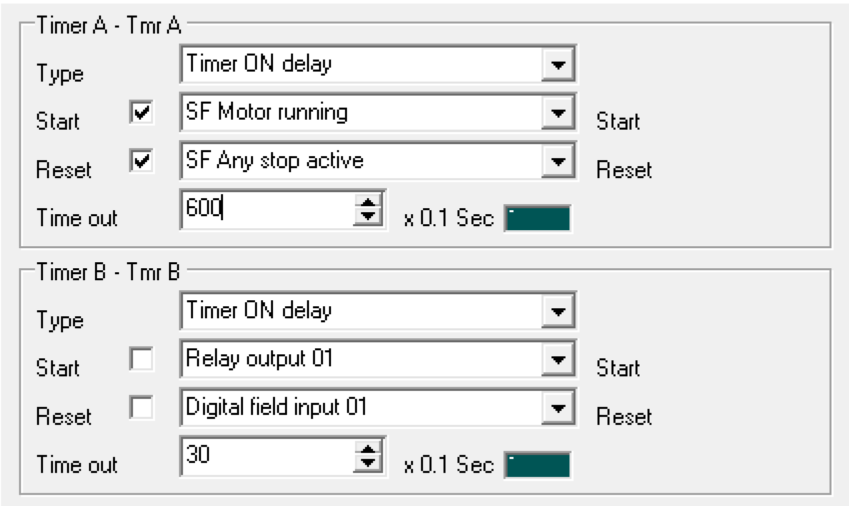
Each timer has four types and each configurations that can be selected as shown below:

- Timer ON delay
- Timer latch ON delay
- Timer latch OFF delay
- Timer ON pulse



Application:

In the Timer A picture shown below, when the Motor Start running, a count of 60 seconds / 1 minute (600 x0.1 Sec) is initiated and the Timer A output is Set. This Timer A output could be used in PLC somewhere to show confirm that the drive in running in steady state. This could be important safety aspect in Ventilation fan in a mine drive.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

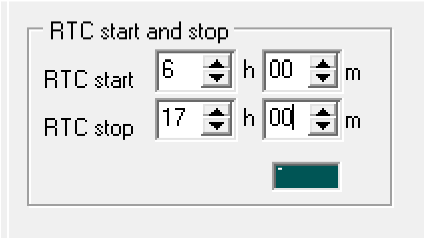
Parameters:

Timers		
Parameter	**Range**	**Description**
Timer A type	• Timer ON delay • Timer latch ON delay • Timer latch OFF delay • Timer ON pulse Default: Timer ON delay.	Type of timer function selected.
Timer A start input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to start the timer.
Timer A reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to reset the timer.
Timer A time out	0 – 65534 x 0.1 Sec (1 x 0.1 Sec) Default: 0.0 Sec.	Time out for the timer function.
Timer B type	• Timer ON delay • Timer latch ON delay • Timer latch OFF delay • Timer ON pulse Default: Timer ON delay.	Type of timer function selected.
Timer B start input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to start the timer.
Timer B reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to reset the timer.
Timer B time out	0 – 65534 x 0.1 Sec (1 x 0.1 Sec) Default: 0.0 Sec.	Time out for the timer function.

13.3 RTC start and stop

Description:

The Real Time Clock (RTC) is used to set the time of the NewFeed relay.



Application:

This is important for application where a protected pump or air conditioning motor needs to run only on certain times, in the picture above only during office hours, 6h00 up to 17h00 in the afternoon.

Parameters:

Timers		
Parameter	**Range**	**Description**
RTC start	00h00 – 23h59 Default: 00h00.	Start time to set the RTC flag.
RTC stop	00h00 – 23h59 Default: 00h00.	Stop time to clear the RTC flag.

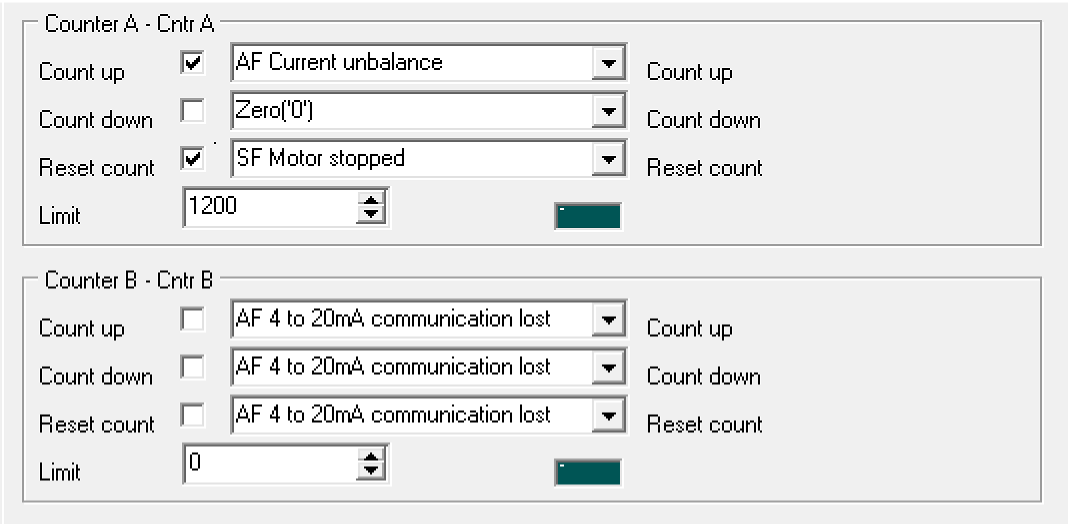
13.4 Counters

Description:

Two counters used to count up and down. Each counter has a count limit that can be set. As soon as the count limit is reached the count flag will go high and requires a reset to reset the count. A up and down input is assigned that needs be pulsed to count up or down.

Application:

An example application is when a Steel smelter electrode is nearing its life and continues to experience, it is not a critical fault in such application, but needs to be monitored and limited to 1200 seconds / 20 minutes.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Counters		
Parameter	**Range**	**Description**
Counter A limit	0 – 65534 (1) Default: 0	Count limit to set the counter flag.
Counter A up input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will increment the counter on a pulse.
Counter A down input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will decrement the counter on a pulse.
Counter A reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will set the counter to 0 on a pulse.
Counter B limit	0 – 65534 (1) Default: 0	Count limit to set the counter flag.
Counter B up input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will increment the counter on a pulse.
Counter B down input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will decrement the counter on a pulse.
Counter B reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used that will set the counter to 0 on a pulse.

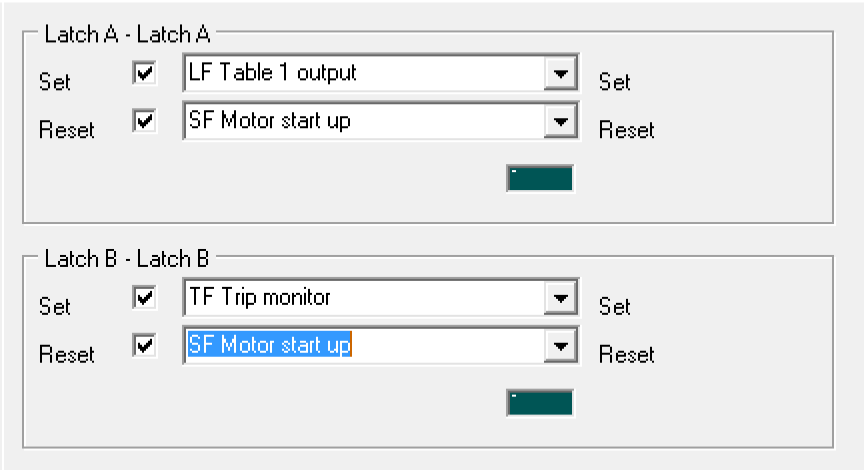
13.5 Latches

Description:

Latch that sets a bit and hold the bits set till a reset is given. Can be used to see if a condition occurred and monitor later as the latch will stay high until a reset is given.

Application:

The application here shows Logic Function 1 and Trip Flag for Main Contactor Coil Continuous monitor, which are latched by Latch A & B respectively. They are only reset when a Motor / Transformer etc. is restarted again.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Latches		
Parameter	**Range**	**Description**
Latch A set input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to set the latch flag.
Latch A reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to clear the latch flag.
Latch B set input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to set the latch flag.
Latch B reset input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to clear the latch flag.

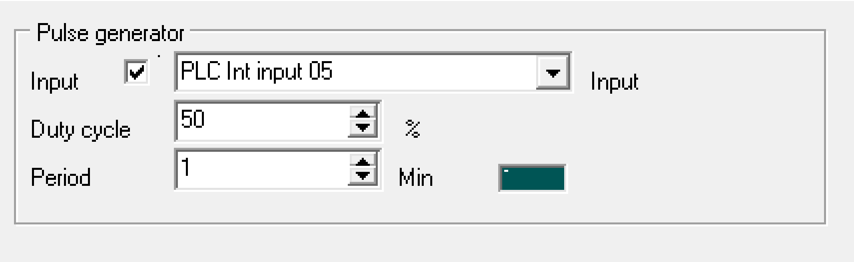
13.6 Pulse generator

Description:

Generates a pulse accordingly to the pulse with and period set.

Application:

This could be useful to generate an extra control signal, for instance where 30 second flash visual light is necessary for a remote pumping station, a safely enclosed transformer container with visual light on the top of container or a remote underground ventilation fan.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Pulse generator		
Parameter	**Range**	**Description**
Pulse generator input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input used to start and indicate continuing of the pulse generator.
Pulse generator duty cycle	0 – 100 % (1 %) Default: 50 %	Duty cycle on period of the pulse.
Pulse generator period	1 – 255 Min (1 Min) Default: 1 Min	Period length in minutes.

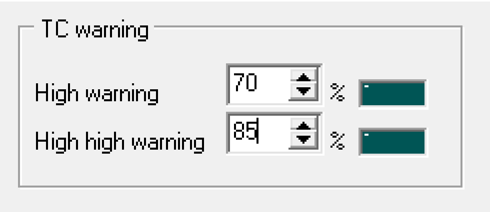
13.7 TC warning

Description:

Logic thermal capacity (TC) warning levels. TC high is the 1st limit the thermal capacity level needs to be over to set TC high level flag. TC high-high is the 2nd limit the thermal capacity level must be over to set TC high-high flag.

Application:

TC Warning can be used to assist operators of an imminent Overload trip, in a crusher application where a trip can cause a lot of unnecessary delays, for example where the crusher must be offloaded manually.



Parameters:

TC Warning		
Parameter	**Range**	**Description**
Thermal warning high level	0 – 100 % (1 %) Default: 70 %	Thermal capacity level must be above to set the TC high level flag.
Thermal warning high high level	0 – 100 % (1 %) Default: 90 %	Thermal capacity level must be above to set the TC high high level flag.

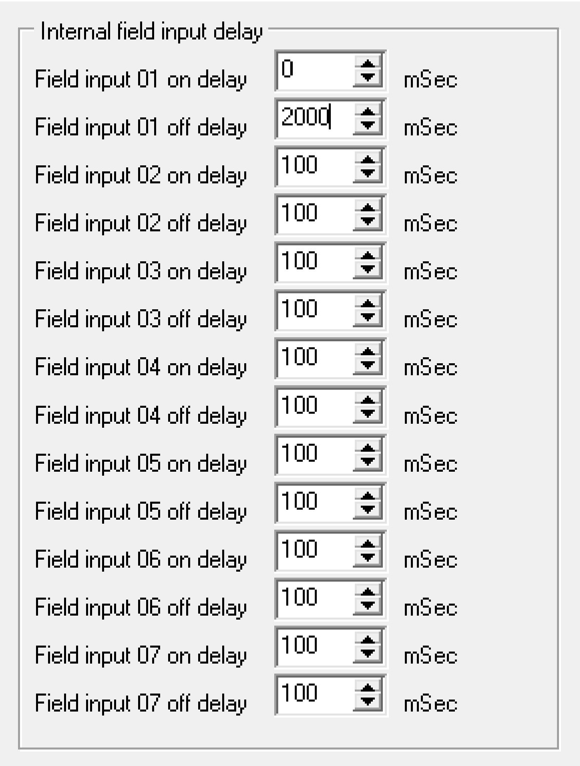
13.8 Internal field inputs delay

Description:

On and off delays that can be set for the field inputs. The time that the field input must be on or off constantly for the input flag to be set or cleared.

Application:

This could be used to avoid a bouncing contact in instruments, for instance a floating switch in Water Treatment works or reservoir.



Parameters:

Field inputs delay		
Parameter	**Range**	**Description**
Field input 01 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 01 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 02 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 02 off delay	0 – 65500 milli Sec (10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 03 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 03 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 04 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 04 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 05 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 05 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 06 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 06 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 07 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 07 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.

13.9 Internal relay inputs

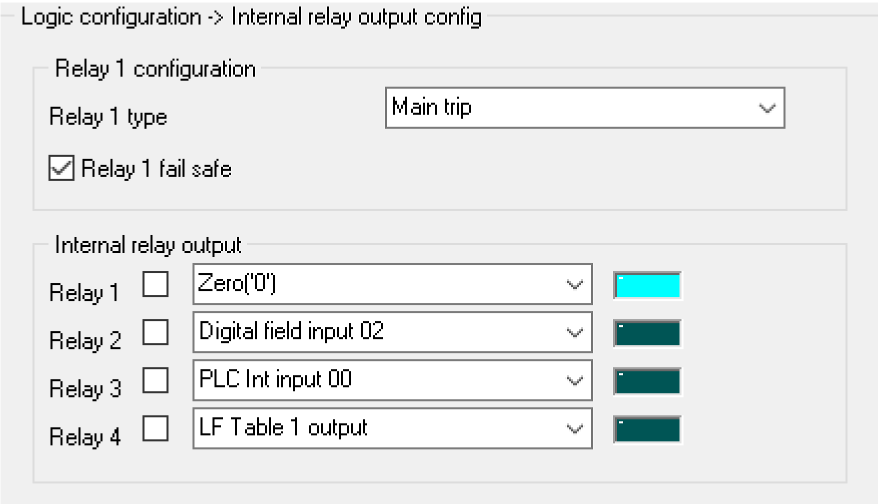
Description:

Logic configuration of the relay input flags can be assigned. Depending on relay 1 configuration which can be configured as a logical or protection functional relay.

Relay 2, 3 and 4 are fully configurable relays. By default, relay 4 is configured to trip the MCCB breaker on critical faults. Earth leakage, Earth fault, Frozen contact and Current single phase.

Application:

All applications.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Internal relays input		
Parameter	**Range**	**Description**
Relay 1 type	• 0 = Logic • 1 = Main trip Default: 0 = Logic	Let the logic structure control relay 1 or the protection features.
Relay 1 fail safe	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Fail safe enabled energizes the relay when all is healthy. This allows no operations when the relay auxiliary is disconnected.
Relay 1 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 1 configuration.
Relay 2 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 2 configuration.
Relay 3 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 3 configuration.
Relay4 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 3 configuration.

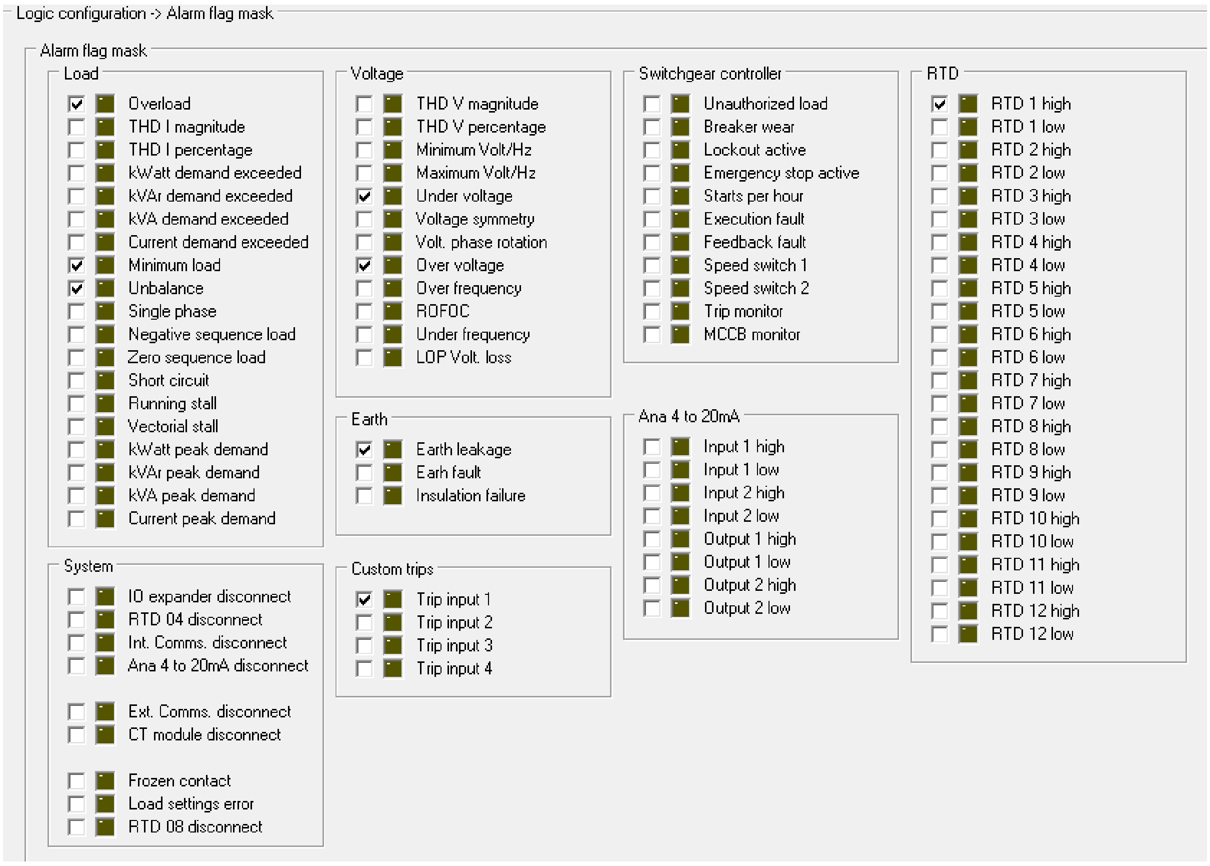
13.10 Alarm flag mask

Description:

Flag used to select certain alarm flags to activate the alarm flag mask.

Application:

Used to filter out nuisance or irrelevant alarm flags to use in a logic or to send to SCADA.



Parameters:

Alarm flag mask		
Parameter	**Range**	**Description**
CT01 Over current	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 Current unbalance	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 Single phase	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 IL negative sequence	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 IL zero sequence	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 THD magnitude	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 Minimum load	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Short circuit	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Running stall	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT01 THD percentage	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Vectorial stall	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
Unauthorized current	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Watt demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VAr demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VA demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Current demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Over voltage	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Under voltage	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Voltage symmetry	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Low line frequency	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 High line frequency	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Minimum Volt/Hz	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
VT01 Maximum Volt/Hz	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 ROFOC	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Phase rotation	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 THD percentage	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 THD magnitude	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
VT01 Voltage not present	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Earth leakage	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Earth fault	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Insulation lockout	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Speed switch 01 RS or LS	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Speed switch 02 RS or LS	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
Contact monitor	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
MCCB monitor	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
IO expander comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 04 comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Internal comms module comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
4 to 20 mA comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
External comms module comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
CT and VT01 connection failure	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Frozen contact	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Breaker wear	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Lock out active	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
Emergency stop	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 08 comms lost	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue input 01 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue input 01 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue input 02 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue output 02 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue output 01 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue output 01 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue output 02 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Analogue output 02 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 01 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
RTD 01 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 02 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 02 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 03 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 03 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 04 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 04 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 05 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 05 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 06 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 06 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
RTD 07 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 07 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 08 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 08 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 09 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 09 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 10 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 10 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 11 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 11 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
RTD 12 high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
RTD 12 low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Last start available	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Execution fault	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Feedback fault	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Load setting fault	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Custom trip 01	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Custom trip 02	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Custom trip 03	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
Custom trip 04	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch1 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch1 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch2 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

Alarm flag mask		
Parameter	**Range**	**Description**
ANSI 77U Ch2 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch3 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch3 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch4 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch4 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch5 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch5 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch6 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch6 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch7 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch7 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77O Ch8 high, high	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.
ANSI 77U Ch8 low, low	• 0 = False • 1 = True Default: 1 = True.	Alarm flag will be OR into alarm flag mask.

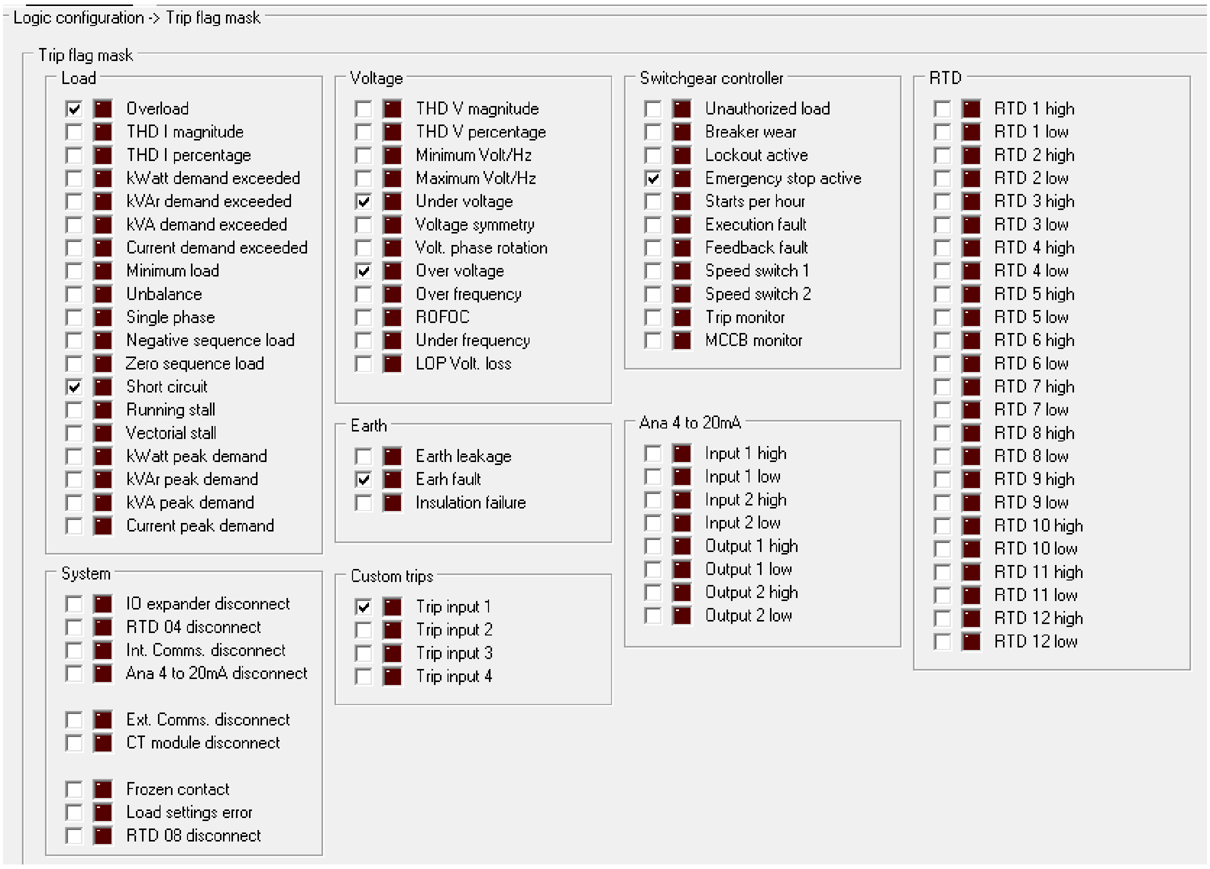
13.11 Trip flag mask

Description:

Flag used to select certain trip flags to activate the trip flag mask.

Application:

Used to filter out nuisance or irrelevant trip flags to use in a logic or to send to SCADA.



Parameters:

Trip flag mask		
Parameter	**Range**	**Description**
CT01 Over current	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 Current unbalance	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 Single phase	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 IL negative sequence	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 IL zero sequence	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 THD magnitude	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 Minimum load	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Short circuit	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Running stall	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT01 THD percentage	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Vectorial stall	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
Unauthorized current	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Watt demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VAr demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VA demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Current demand exceeded	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Over voltage	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Under voltage	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Voltage symmetry	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Low line frequency	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 High line frequency	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Minimum Volt/Hz	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
VT01 Maximum Volt/Hz	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 ROFOC	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Phase rotation	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 THD percentage	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 THD magnitude	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
VT01 Voltage not present	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Earth leakage	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Earth fault	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Insulation lockout	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Speed switch 01 RS or LS	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Speed switch 02 RS or LS	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
Contact monitor	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
MCCB monitor	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
IO expander comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 04 comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Internal comms module comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
4 to 20 mA comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
External comms module comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
CT and VT01 connection failure	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Frozen contact	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Breaker wear	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Lock out active	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
Emergency stop	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 08 comms lost	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue input 01 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue input 01 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue input 02 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue output 02 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue output 01 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue output 01 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue output 02 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Analogue output 02 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 01 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
RTD 01 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 02 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 02 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 03 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 03 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 04 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 04 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 05 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 05 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 06 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 06 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
RTD 07 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 07 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 08 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 08 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 09 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 09 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 10 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 10 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 11 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 11 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
RTD 12 high	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
RTD 12 low	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Starts per hour	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Execution fault	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Feedback fault	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Load setting fault	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Custom trip 01	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Custom trip 02	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Custom trip 03	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
Custom trip 04	• 0 = False • 1 = True Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch1 high, high	• 0 = False • 1 = True • Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch1 low, low	• 0 = False • 1 = True 14 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch2 high, high	• 0 = False • 1 = True 15 Default: 1 = True.	Trip flag will be OR into trip flag mask.

Trip flag mask		
Parameter	**Range**	**Description**
ANSI 77U Ch2 low, low	• 0 = False • 1 = True 16 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch3 high, high	• 0 = False • 1 = True 17 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch3 low, low	• 0 = False • 1 = True 18 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch4 high, high	• 0 = False • 1 = True 19 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch4 low, low	• 0 = False • 1 = True 20 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch5 high, high	• 0 = False • 1 = True 21 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch5 low, low	• 0 = False • 1 = True 22 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch6 high, high	• 0 = False • 1 = True 23 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch6 low, low	• 0 = False • 1 = True 24 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch7 high, high	• 0 = False • 1 = True 25 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch7 low, low	• 0 = False • 1 = True 26 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77O Ch8 high, high	• 0 = False • 1 = True 27 Default: 1 = True.	Trip flag will be OR into trip flag mask.
ANSI 77U Ch8 low, low	• 0 = False • 1 = True 28 Default: 1 = True.	Trip flag will be OR into trip flag mask.

28.1 Comparators

Description:

Compare input analogue value against high high, high low, low high and low low.

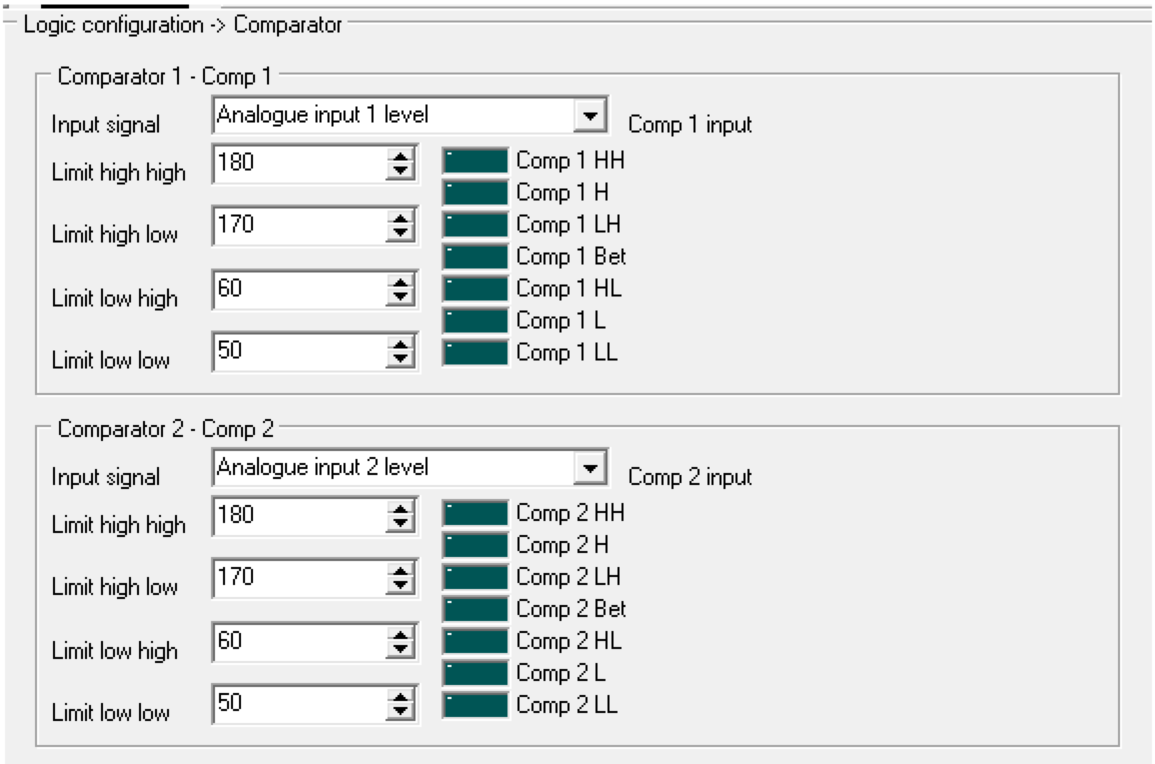
2 comparators are available.

7 flags will be set depending on the value and the limits set.

- LF Comp 1 high, high
  - Level must go above the high, high level to set the flag.
  - Level must go below the high, high level to clear the flag.
- LF Comp 1 high, low
  - Level must go above the high, low level to set the flag.
  - Level must go below the high, low level to clear the flag.
- LF Comp 1 high
  - Level must go above the high, high to set the flag.
  - Level must go below the high level to clear the flag.
- LF Comp 1 Between
  - Level must go below the high level and above the low level to set the flag.
  - Level must go below the low level or above the high level to clear the flag.
- LF Comp 1 low
  - Level must go below the low, low to set the flag.
  - Level must go above the low level to clear the flag.
- LF Comp 1 low, high
  - Level must go below the low, high level to set the flag.
  - Level must go above the low, high level to clear the flag.
- LF Comp 1 low, low
  - Level must go below the low, low level to set the flag.
  - Level must go above the low, low level to clear the flag.

Application:

Logic indication of where a containers or device level is.



Parameters:

Comparator		
Parameter	**Range**	**Description**
Comp 1 input signal	Comparator lookup table for selected input. Default: Int. Comms Word 1.	See comparator lookup table for parameter input. Input word for comparator.
Comp 1 high, high limit	0 – 65534 (1) Default: 65000	High, high limit of the comparator.
Comp 1 high, low limit	0 – 65534 (1) Default: 60000	High, low limit of the comparator.
Comp 1 low, high limit	0 – 65534 (1) Default: 1000	Low, high limit of the comparator.
Comp 1 low, low limit	0 – 65534 (1) Default: 500	Low, low limit of the comparator.

Comparator		
Parameter	**Range**	**Description**
Comp 2 input signal	Comparator lookup table for selected input. Default: Int. Comms. Word 2.	See comparator lookup table for parameter input. Input word for comparator.
Comp 2 high, high limit	0 – 65534 (1) Default: 65000	High, high limit of the comparator.
Comp 2 high, low limit	0 – 65534 (1) Default: 60000	High, low limit of the comparator.
Comp 2 low, high limit	0 – 65534 (1) Default: 1000	Low, high limit of the comparator.
Comp 2 low, low limit	0 – 65534 (1) Default: 500	Low, low limit of the comparator.

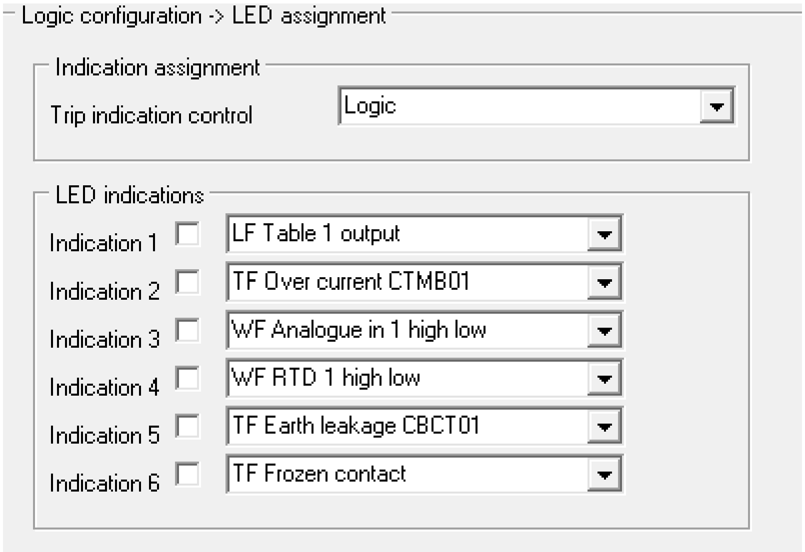
28.2 Custom user LED indication

Description:

Front control panel trip (Red) LED’s can be configured to flags instead of indicating protection faults. LED configuration must be set to logic.

Application:

Custom indications of the NewFeed relay faults or states.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

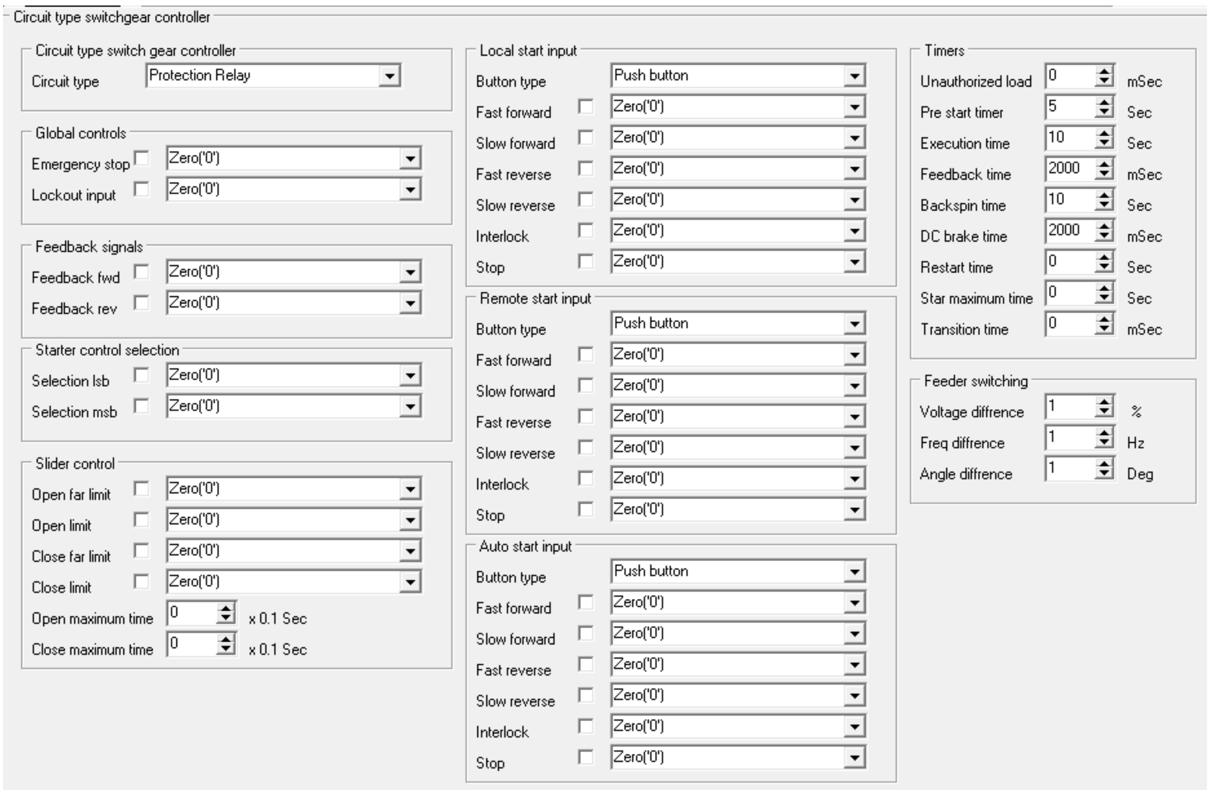
Parameters:

Custom user LED indication		
Parameter	**Range**	**Description**
Trip indication control	• 0 = Protection • 1 = Logic Default: 0 = Protection	Protection indicates predefined programmed fault indications. Logic indicates user defined conditions.
User 1 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.
User 2 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.
User 3 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.
User 4 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.
User 5 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.
User 6 indication	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for LED indication configuration.

29 CIRCUIT TYPE SWITCHGEAR CONTROLLER

Internal low voltage starter controller is places into the NewFeed to lessen the load of the SCADA system to do starter controlling as well.

The protection feature is integrated into the starter logic. When the protection feature trips then the NewFeed protection will stop the low voltage starter controller.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

29.1 Type - Protection

Description:

Basic protection relay that will protect a device with ANSI protection features. This type of circuit requires no intelligent.

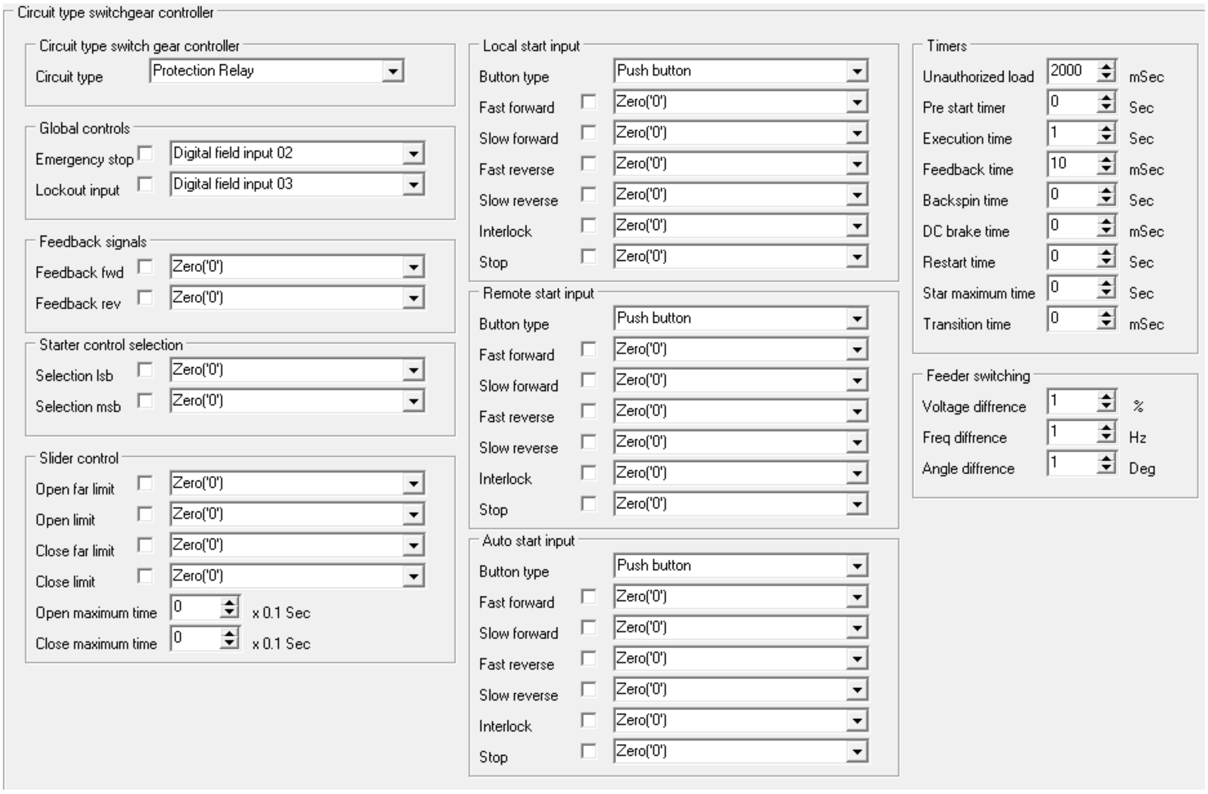
Most features are disabled on the circuit type panel.

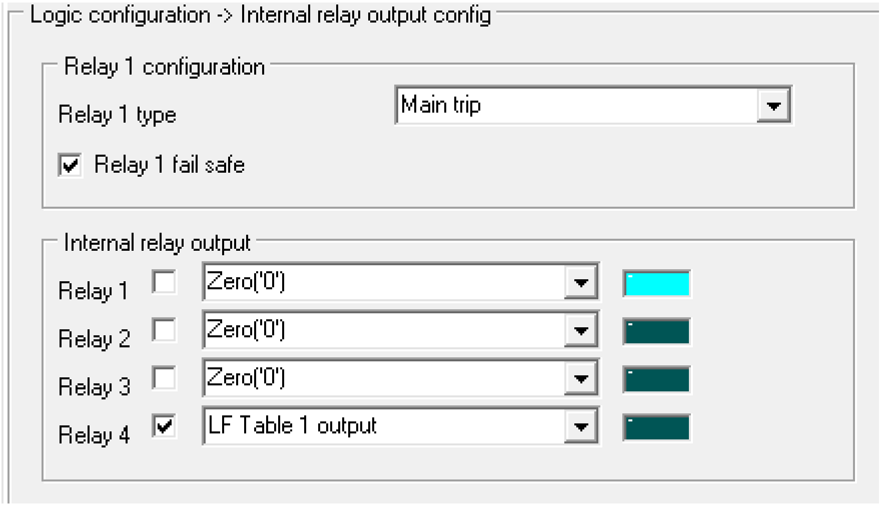
Only features that are as follow:

- Emergency stop
- Lockout input
- Feedback forward input
- Unauthorized load

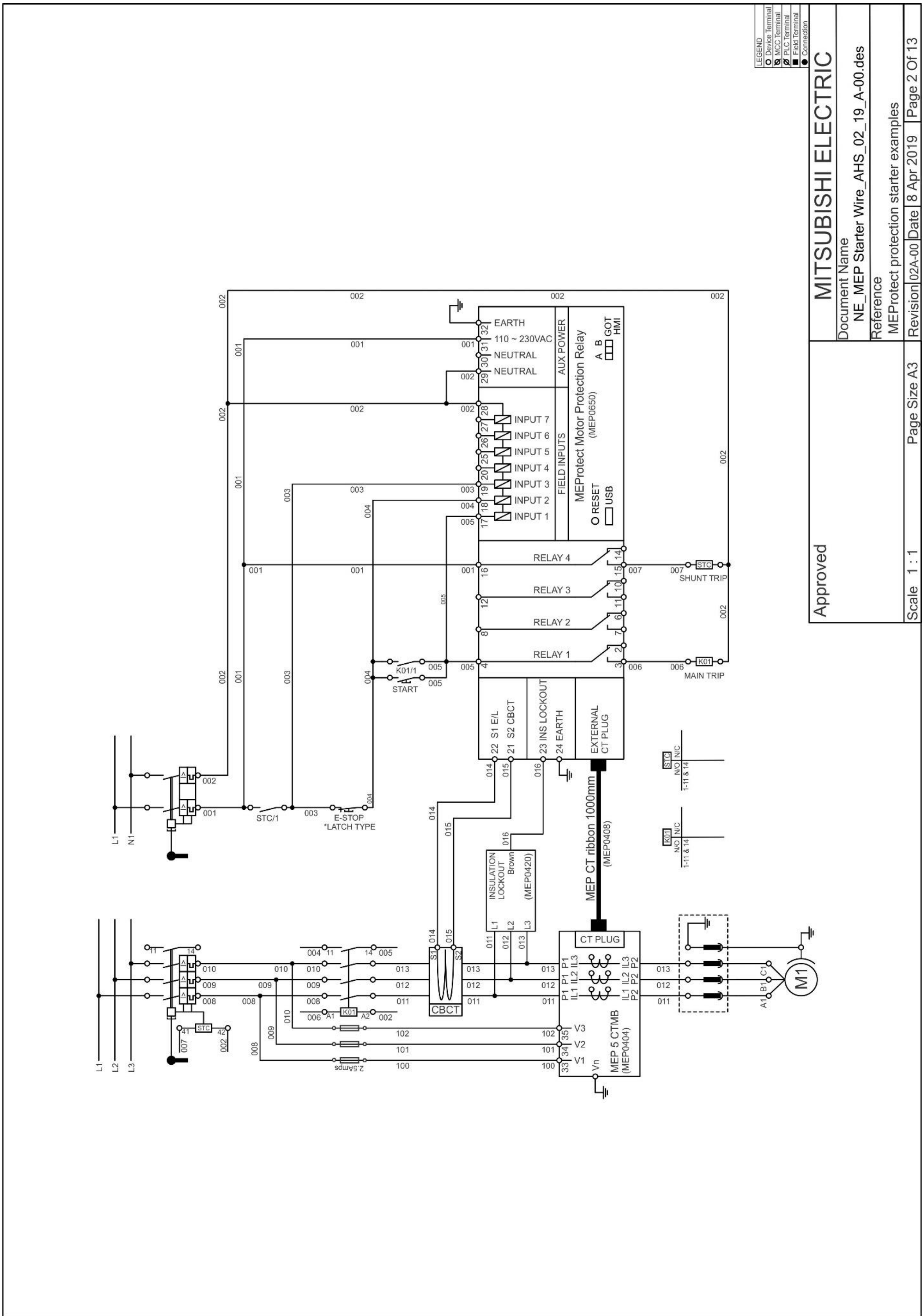
Application:

Custom indications of the NewFeed relay faults or states.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true).  Zero('0')


MITSUBISHI ELECTRIC
Document Name
NE_MEP Starter Wire_AHS_02_19_A-00.des
Reference
MEProtect protection starter examples
Revision 02A-00
Date 8 Apr 2019
Page 2 Of 13
Approved
Page Size A3
Scale 1 : 1
MEProtect Motor Protection Relay
(MEP0650)
MEP CT ribbon 1000mm
(MEP0408)
MEP 5 CTMB
(MEP0404)
INSULATION LOCKOUT
(MEP0420)
RELAY 1
RELAY 2
RELAY 3
RELAY 4
MAIN TRIP
SHUNT TRIP
E-STOP
*LATCH TYPE
START
CBCT
CT PLUG

Parameters:

Circuit type - Protection		
Parameter	**Range**	**Description**
Circuit type	0 = Protection relay	Configure circuit type as a protection relay.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback forward	Logic lookup table for selected input. Default: Zero.	Indicate the state of the main contactor. Zero will disable this feature and Current present CTMB01 will be used.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.

29.2 Type – DOL starter

Description:

Used with DOL motors and feeder panels.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

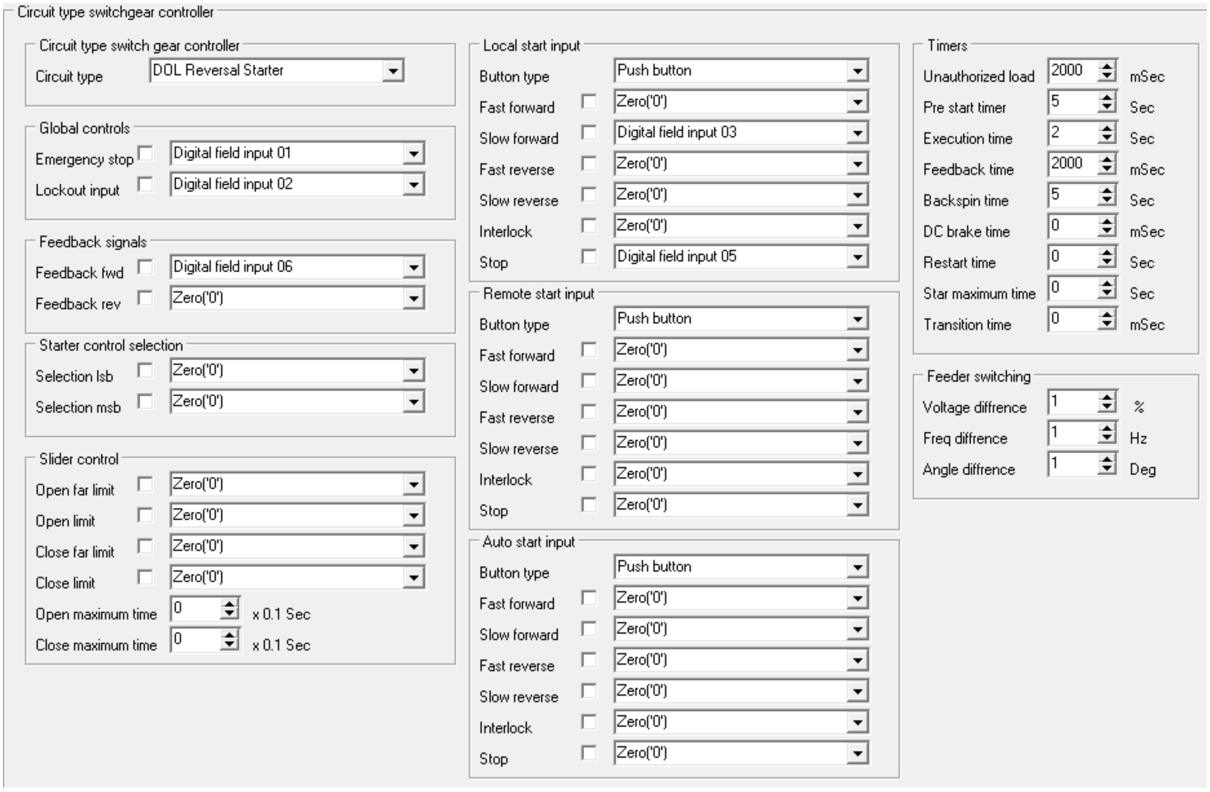
- Slow forward => Start switchgear
- Interlock => Interlock
- Stop => Stop

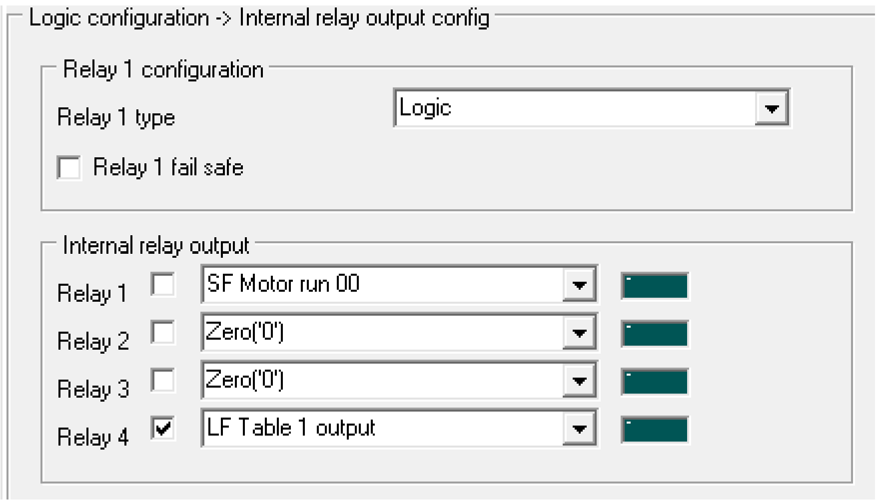
Following motor status flags change:

- SF Motor run 00 => Main contactor

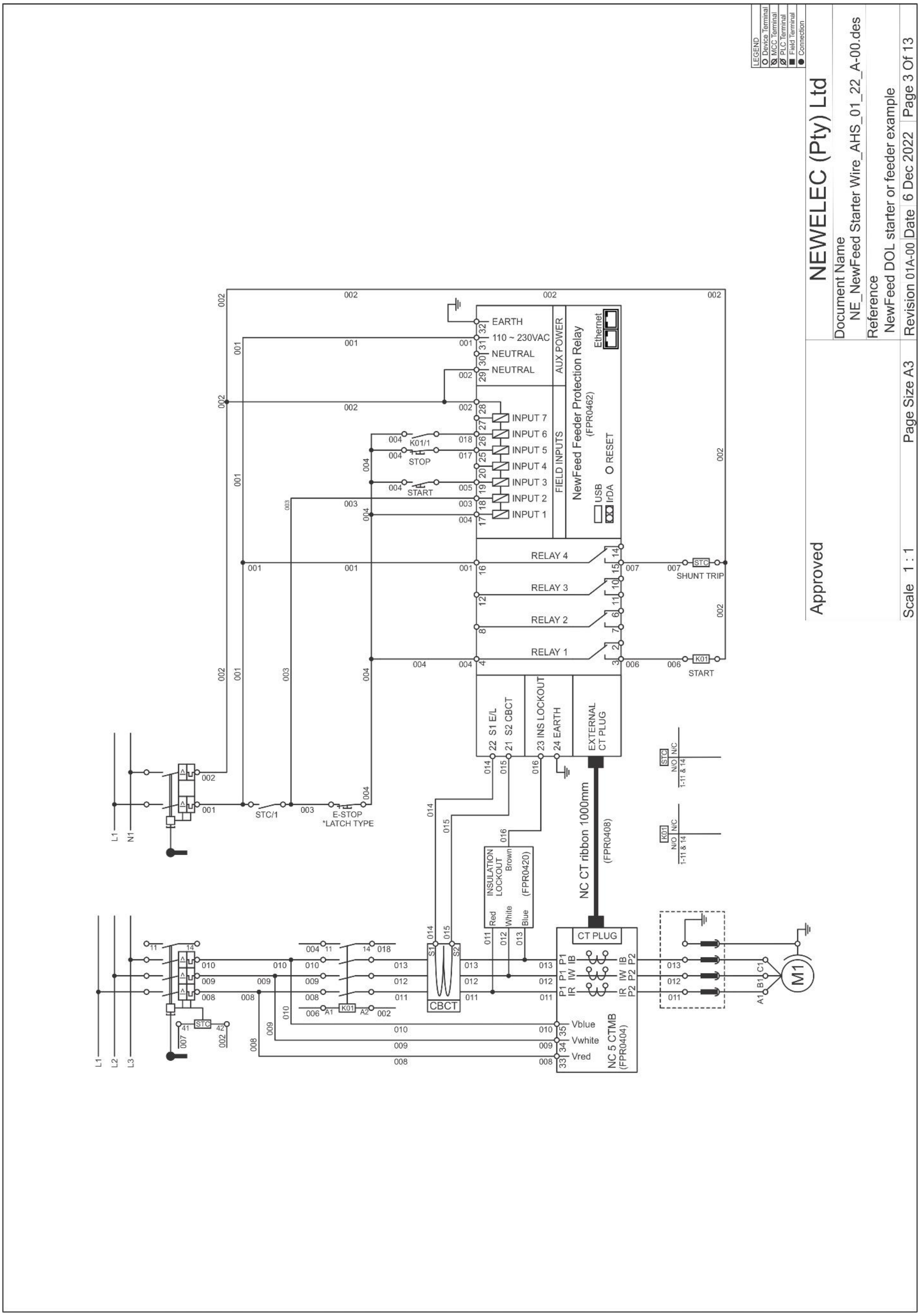
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed DOL starter or feeder example
Revision 01A-00
Date 6 Dec 2022
Page 3 Of 13
Approved
Page Size A3
Scale 1 : 1
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Ethernet
USB
IrDA
RESET
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
START
STOP
E-STOP
*LATCH TYPE
S1 E/L
S2 CBCT
23 INS LOCKOUT
24 EARTH
EXTERNAL CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION LOCKOUT
(FPR0420)
CBCT
CT PLUG
NC 5 CTMB
(FPR0404)
Vblue
Vwhite
Vred
M1

Parameters:

Circuit type – DOL starter		
Parameter	**Range**	**Description**
Circuit type	1 = DOL starter	Configure circuit type as a direct online switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the main contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.

Circuit type – DOL starter		
Parameter	**Range**	**Description**
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.

Circuit type – DOL starter		
Parameter	**Range**	**Description**
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.

29.3 Type – DOL reversal starter

Description:

Used with DOL motors and feeder panels.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward and reverse
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Slow forward => Start switchgear forward/clock wise
- Slow reverse => Start switchgear reverse/anti clock wise
- Interlock => Interlock
- Stop => Stop

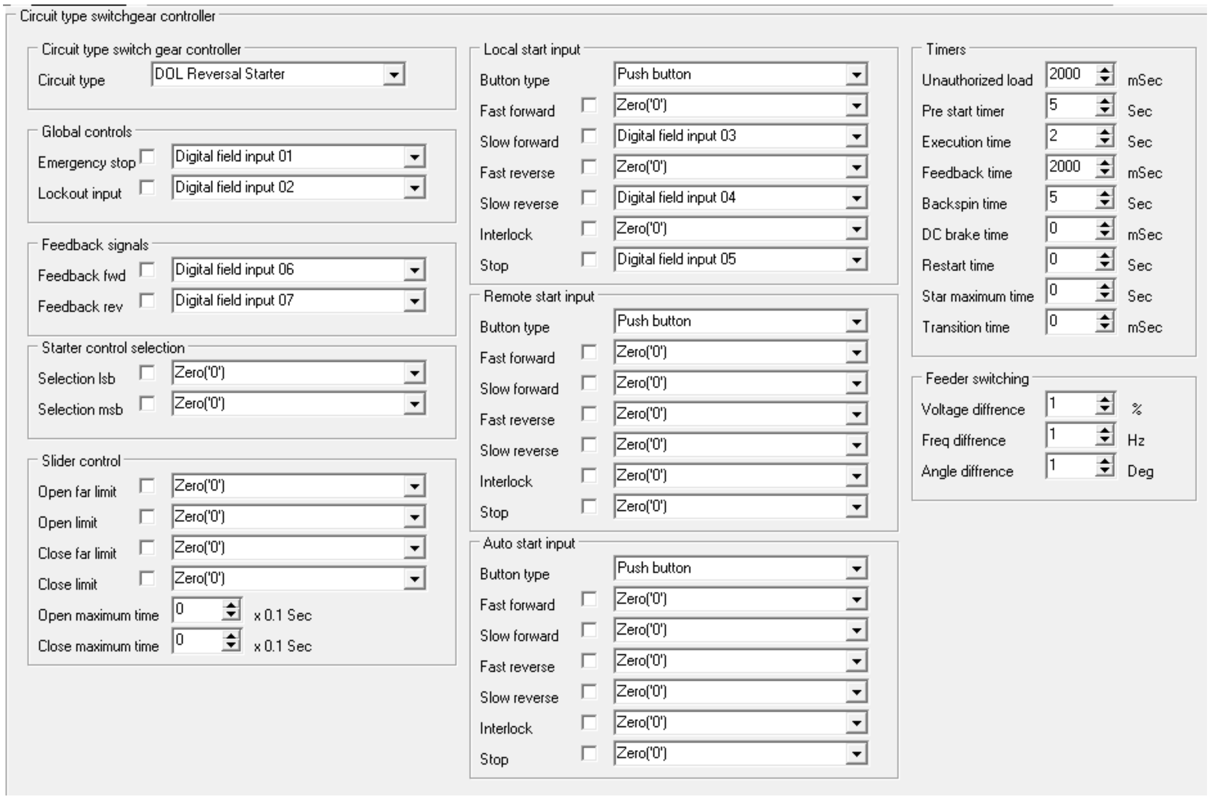
Following motor status flags change:

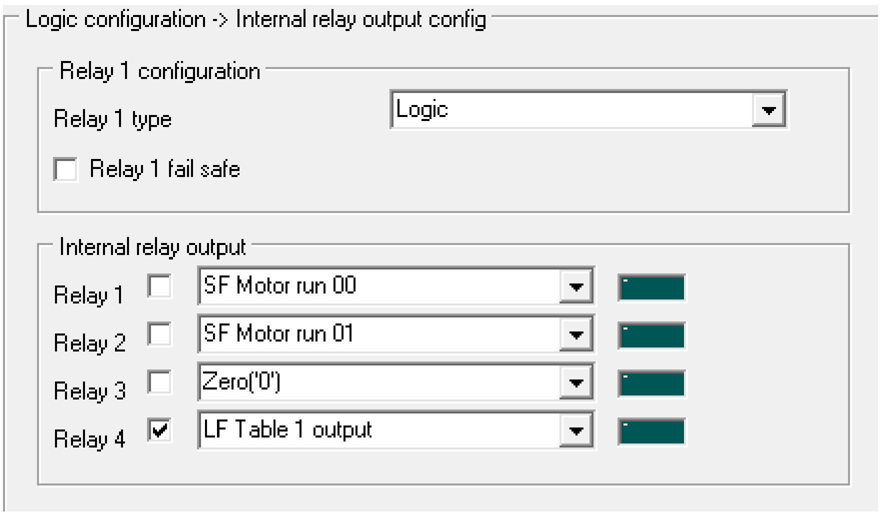
- SF Motor run 00 => Forward contactor
- SF Motor run 01 => Reverse contactor

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the forward and reverse contactor.

Application:

Switchgear panels.

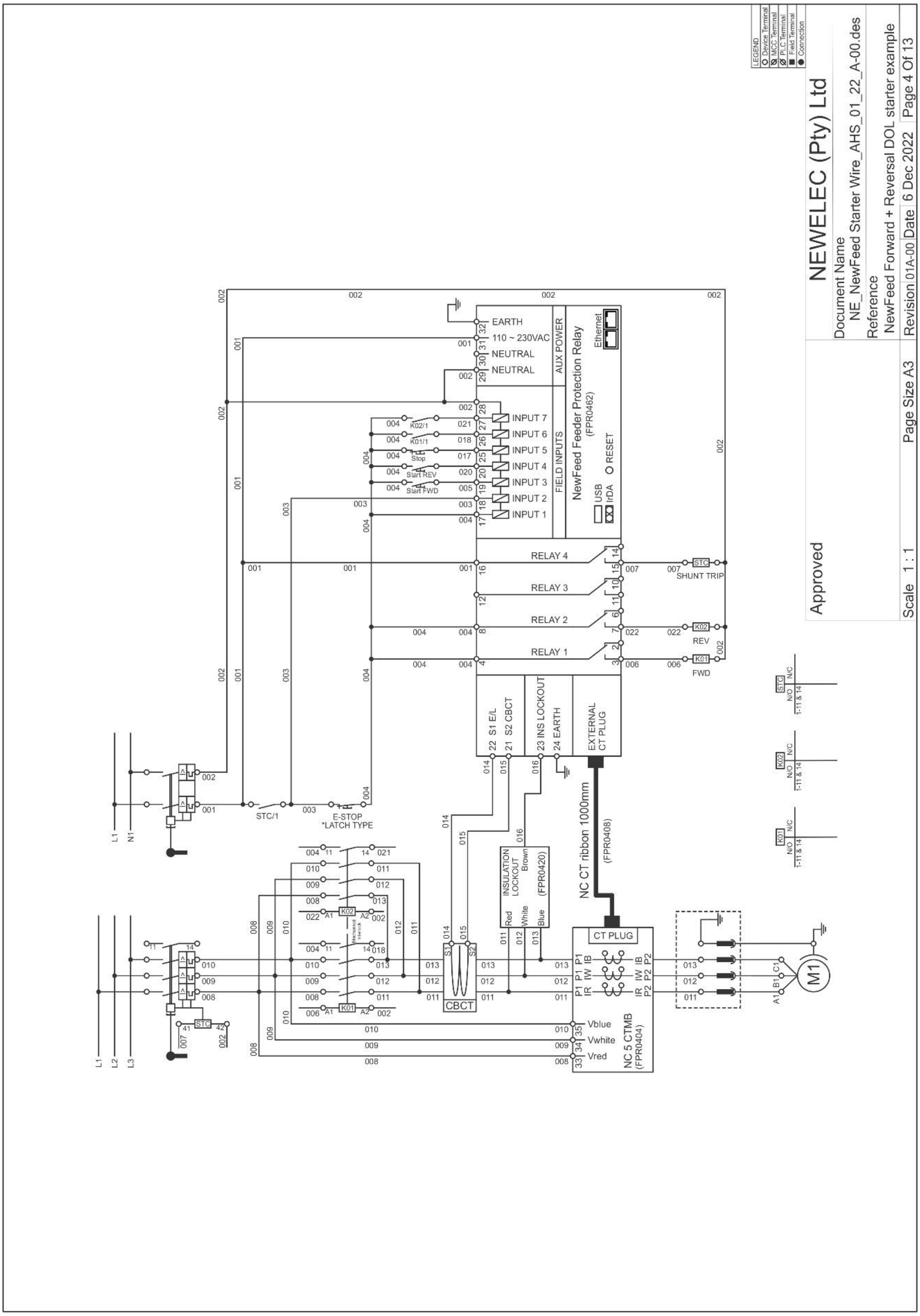




NOTE ON FLAG INPUT SELECTION BOX

Checkbox in front of input signal means that signal will be inverted

(True = false and False = true).


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed Forward + Reversal DOL starter example
Revision 01A-00
Date 6 Dec 2022
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Scale 1 : 1
Approved
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
REV
FWD
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION LOCKOUT
(FPR0420)
CT PLUG
NC 5 CTMB
(FPR0404)
CBCT
E-STOP
*LATCH TYPE
STC/1
M1

Parameters:

Circuit type – DOL starter reversal		
Parameter	**Range**	**Description**
Circuit type	2 = DOL Reversal Starter	Configure circuit type as a direct online reversal switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the forward contactor. Zero will disable this feature and Current present CTMB01 will be used.
Feedback rev	Logic lookup table for selected input. Default: Zero.	Indicate the state of the reverse contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Local start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.

Circuit type – DOL starter reversal		
Parameter	**Range**	**Description**
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Remote start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Auto start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.

Circuit type – DOL starter reversal		
Parameter	**Range**	**Description**
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.

29.4 Type – Star delta starter

Description:

Used with DOL motors.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Slow forward => Start switchgear
- Interlock => Interlock
- Stop => Stop

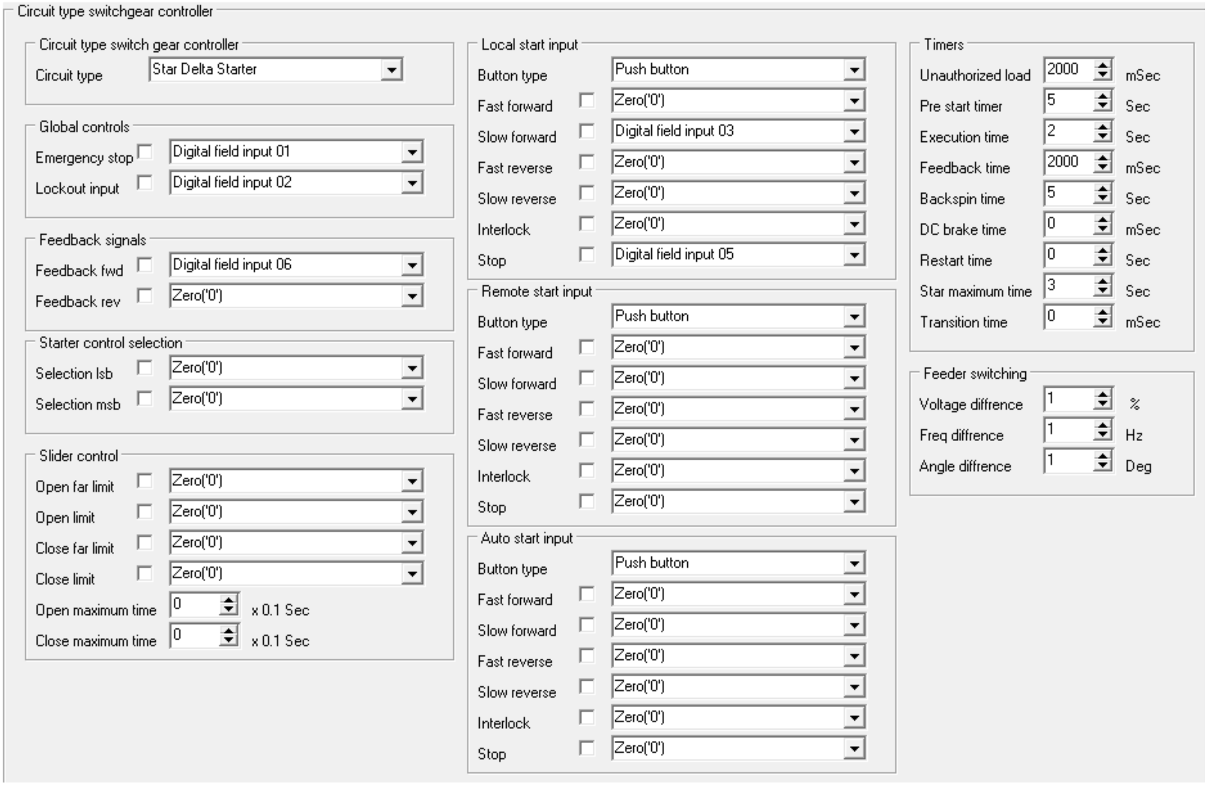
Following motor status flags change:

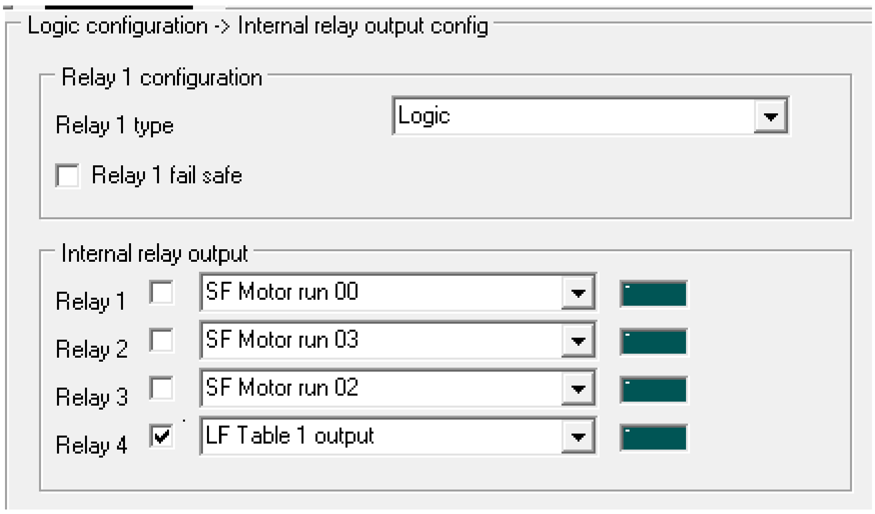
- SF Motor run 00 => Main contactor
- SF Motor run 02 => Star contactor
- SF Motor run 03 => Delta contactor

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the star and delta contactor.

Application:

Switchgear panels.

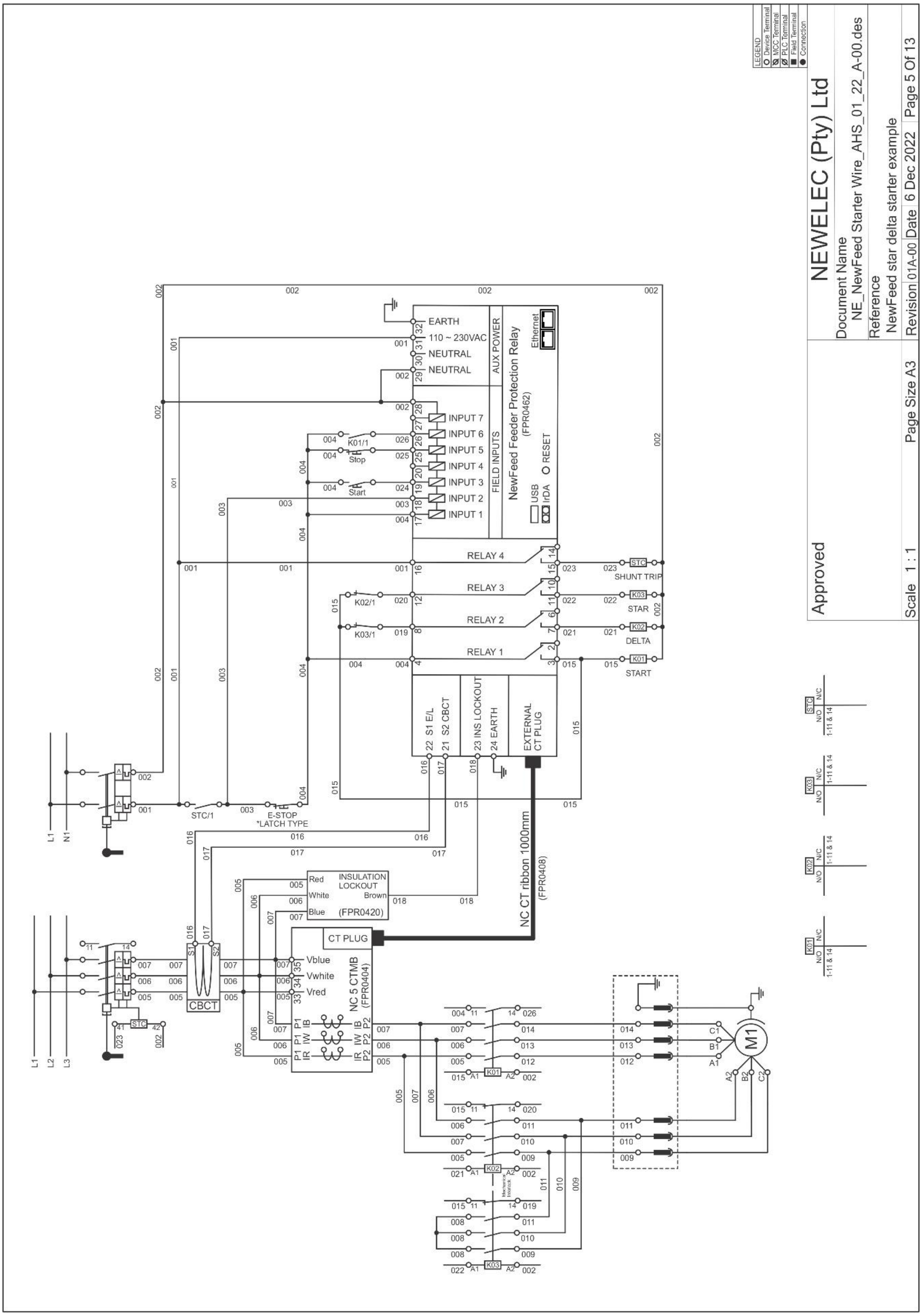




NOTE ON FLAG INPUT SELECTION BOX

Checkbox in front of input signal means that signal will be inverted

(True = false and False = true).


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed star delta starter example
Revision 01A-00
Date 6 Dec 2022
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Scale 1 : 1
LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Ethernet
USB
IrDA
RESET
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
STAR
DELTA
START
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION LOCKOUT
(FPR0420)
CT PLUG
NC 5 CTMB
(FPR0404)
Vblue
Vwhite
Vred
CBCT
STC/1
E-STOP
*LATCH TYPE
K01/1
Stop
Start
K02/1
K03/1
M1

Parameters:

Circuit type – Star delta starter		
Parameter	**Range**	**Description**
Circuit type	3 = Star Delta Starter	Configure circuit type as a star delta switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the star and delta contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.

Circuit type – Star delta starter		
Parameter	**Range**	**Description**
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.

Circuit type – Star delta starter		
Parameter	**Range**	**Description**
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Star maximum time	0 – 50 Sec (1 Sec) Default: 0 Sec.	Maximum time to wait for the star current to drop below 100% so that the delta contactor can be engaged. 0 Sec disables this feature.
Transition time	10 – 2000 milli Sec(10 milli Sec) Default: 100 milli Sec	Gap time for change state from star to delta.

29.5 Type – Star delta reversal starter

Description:

Used with DOL motors.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward and reverse
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Slow forward => Start switchgear forward/clock wise
- Slow reverse => Start switchgear reverse/anti clock wise
- Interlock => Interlock
- Stop => Stop

Following motor status flags change:

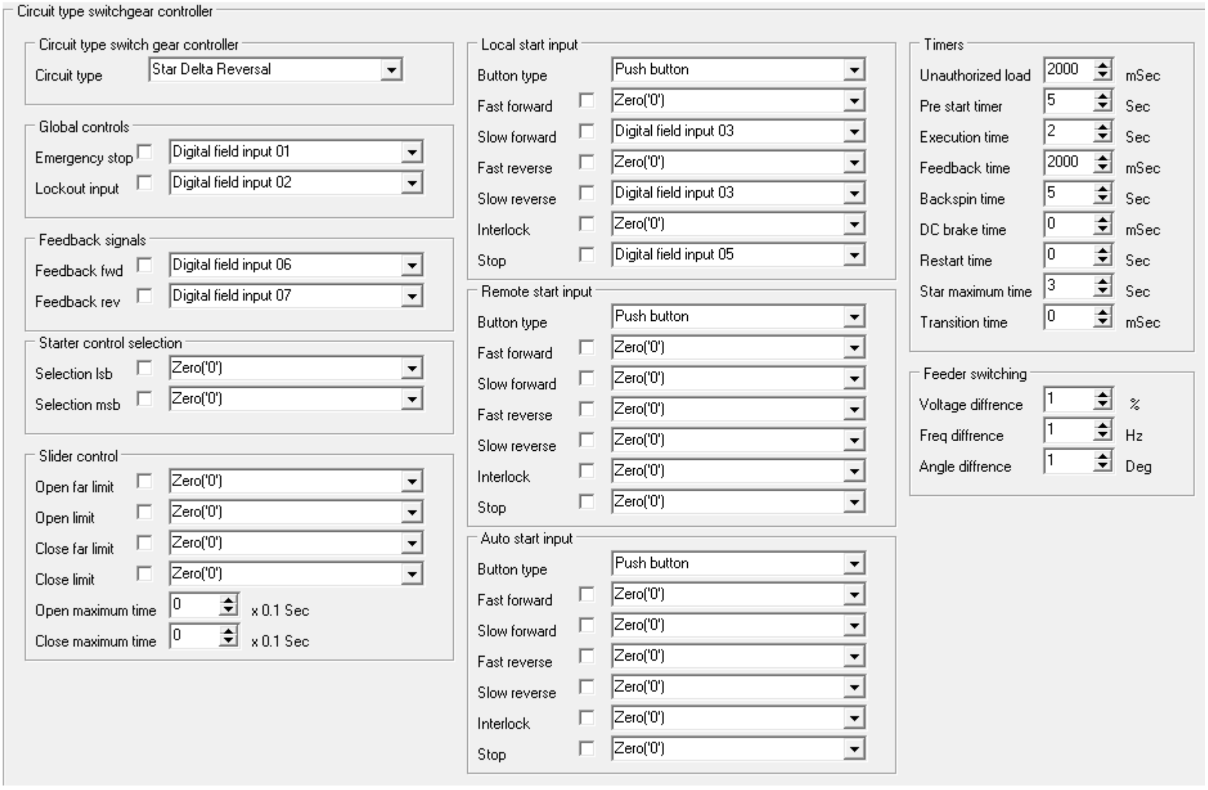
- SF Motor run 00 => Forward contactor
- SF Motor run 01 => Reverse contactor
- SF Motor run 02 => Star contactor
- SF Motor run 03 => Delta contactor

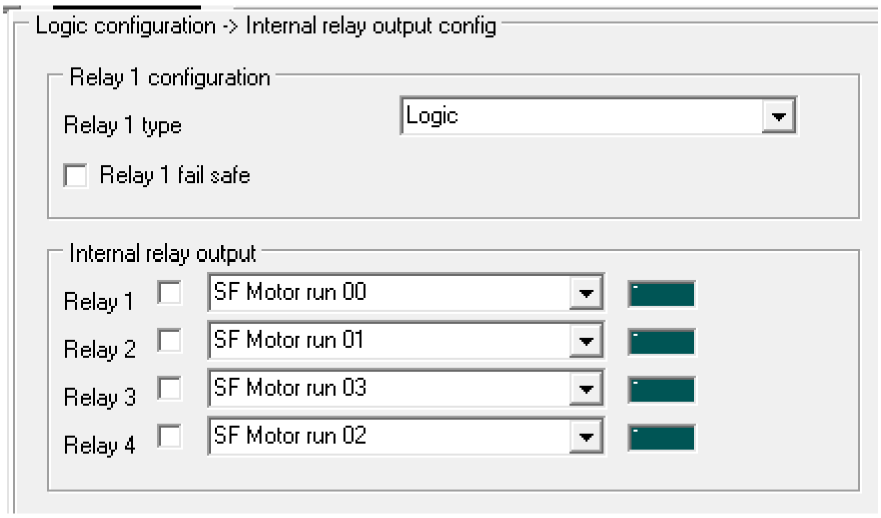
!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the forward and reverse contactor.

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the star and delta contactor.

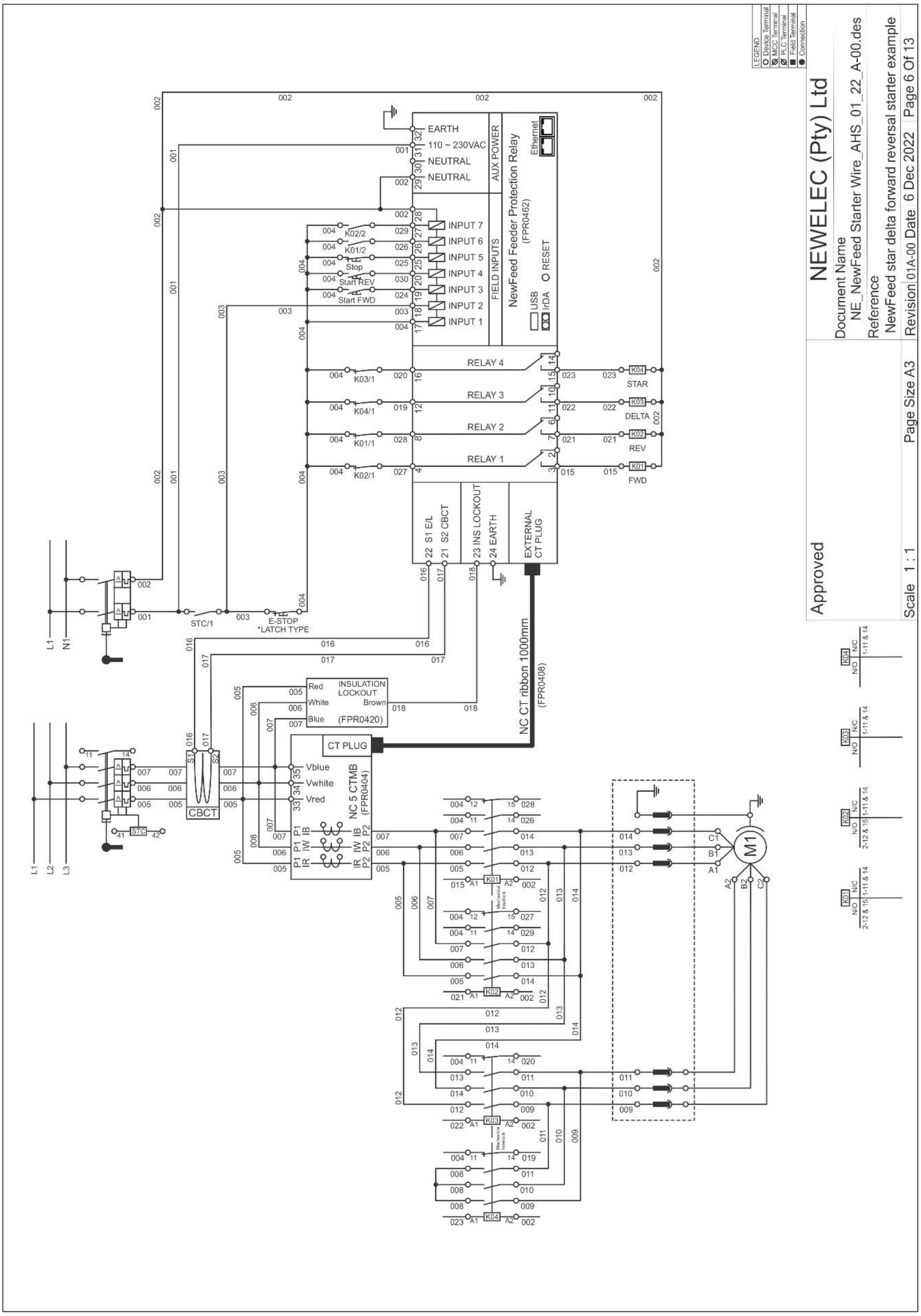
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed star delta forward reversal starter example
Revision 01A-00 Date 6 Dec 2022 Page 6 Of 13
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Approved
Scale 1 : 1
NewFEED Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
RELAY 4
RELAY 3
RELAY 2
RELAY 1
INSULATION LOCKOUT
(FPR0420)
NC 5 CTMB
(FPR0404)
CT PLUG
CBCT
NC CT ribbon 1000mm
(FPR0408)
E-STOP
*LATCH TYPE
STAR
DELTA
REV
FWD
M1

Parameters:

Circuit type – Star delta reversal starter		
Parameter	**Range**	**Description**
Circuit type	4 = Star Delta Reversal Starter	Configure circuit type as a star delta reversal switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the forward contactor. Zero will disable this feature and Current present CTMB01 will be used.
Feedback rev	Logic lookup table for selected input. Default: Zero.	Indicate the state of the reverse contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Local start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.

Circuit type – Star delta reversal starter		
Parameter	**Range**	**Description**
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Remote start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Auto start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.

Circuit type – Star delta reversal starter		
Parameter	**Range**	**Description**
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Star maximum time	0 – 50 Sec (1 Sec) Default: 0 Sec.	Maximum time to wait for the star current to drop below 100% so that the delta contactor can be engaged. 0 Sec disables this feature.
Transition time	10 – 2000 milli Sec(10 milli Sec) Default: 100 milli Sec	Gap time for change state from star to delta.

29.6 Type - Dahlander starter

Description:

Used with two pole motors with a fast and slow pole.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Fast forward => Start switchgear with fast pole
- Slow forward => Start switchgear with slow pole
- Interlock => Interlock
- Stop => Stop

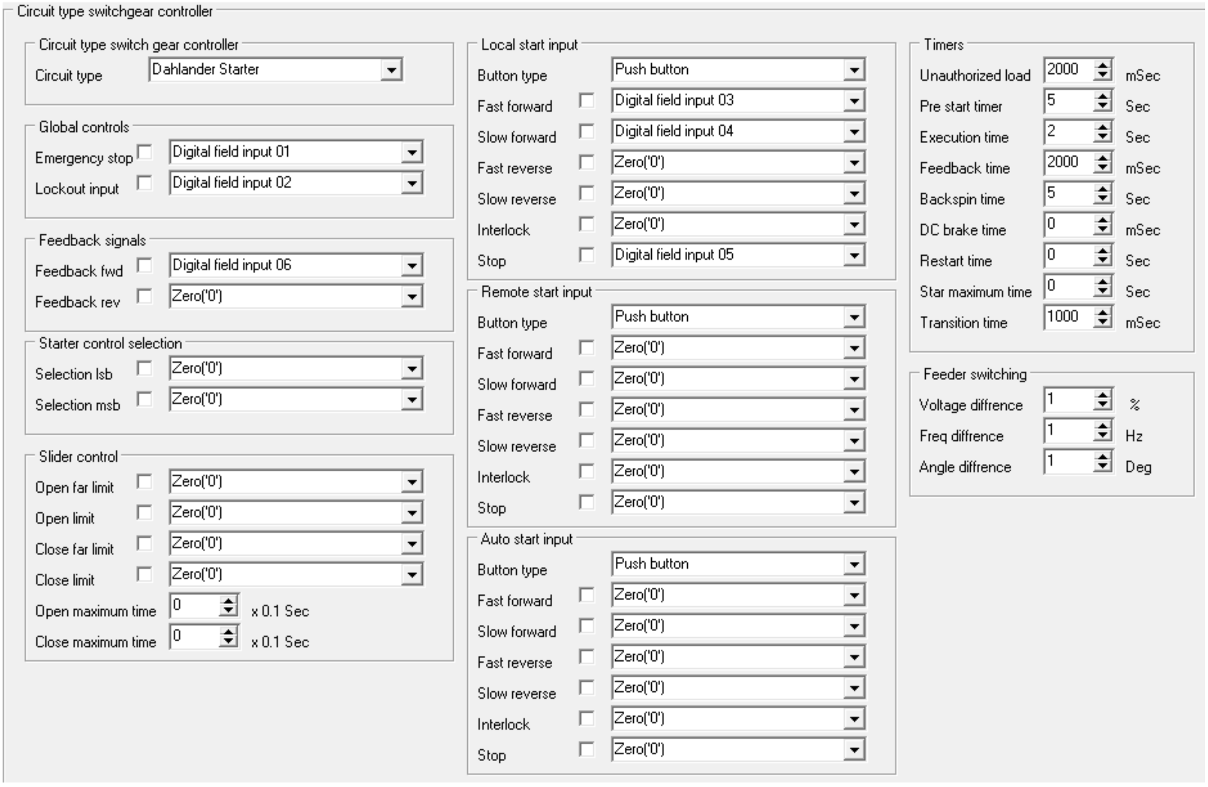
Following motor status flags change:

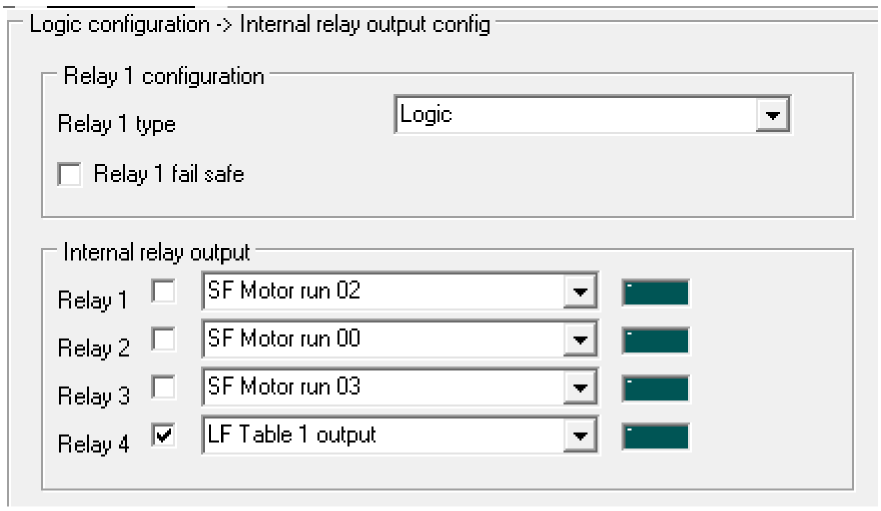
- SF Motor run 00 => Slow contactor
- SF Motor run 02 => Fast contactor
- SF Motor run 03 => Fast star contactor

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the star and slow speed contactor.

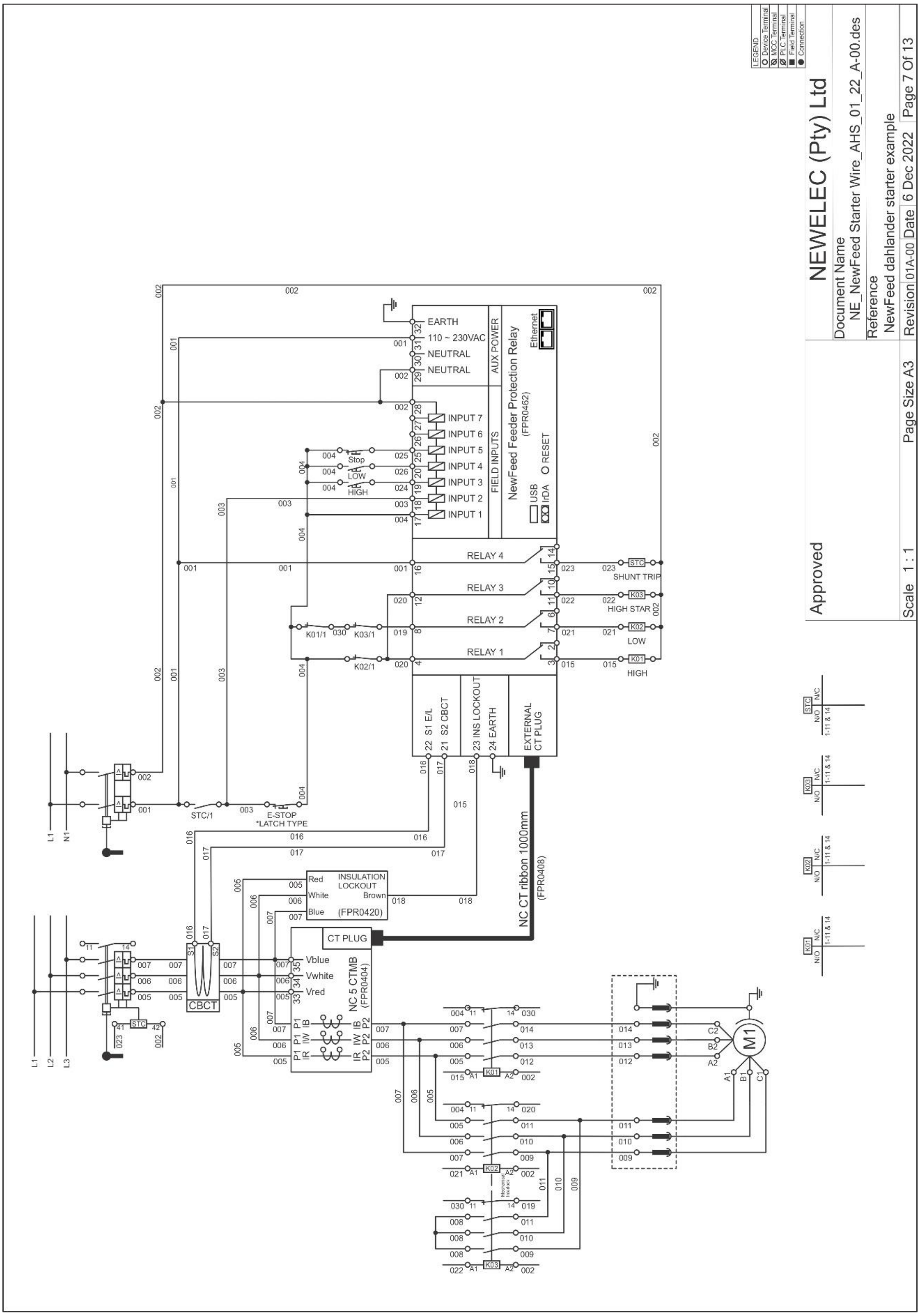
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed dahlander starter example
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Scale 1 : 1
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NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
HIGH STAR
LOW
HIGH
USB
IrDA
RESET
Ethernet
EXTERNAL CT PLUG
INS LOCKOUT
EARTH
S1 E/L
S2 CBCT
INSULATION LOCKOUT
(FPR0420)
CT PLUG
NC 5 CTMB
(FPR0404)
NC CT ribbon 1000mm
(FPR0408)
CBCT
E-STOP
*LATCH TYPE
STC/1
Stop
LOW
HIGH
M1

Parameters:

Circuit type – Dahlander starter		
Parameter	**Range**	**Description**
Circuit type	5 = Dahlander Starter	Configure circuit type as a two pole switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.

Circuit type – Dahlander starter		
Parameter	**Range**	**Description**
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.

Circuit type – Dahlander starter		
Parameter	**Range**	**Description**
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Transition time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Gap time to let the motor slow down before activating the slow speed to prevent shaft twist. 0 milli Sec disables this feature.

29.7 Type – Dahlander reversal starter

Description:

Designed for a pole changing motor with fast and slow poles.

!!!! WARNING !!!!	
	IO expander module will be needed for Dahlander reversal configuration.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward and reverse
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Fast forward => Start switchgear fast forward/clock wise
- Slow forward => Start switchgear slow forward/clock wise
- Fast reverse => Start switchgear fast reverse/anti clock wise
- Slow reverse => Start switchgear slow reverse/anti clock wise
- Interlock => Interlock
- Stop => Stop

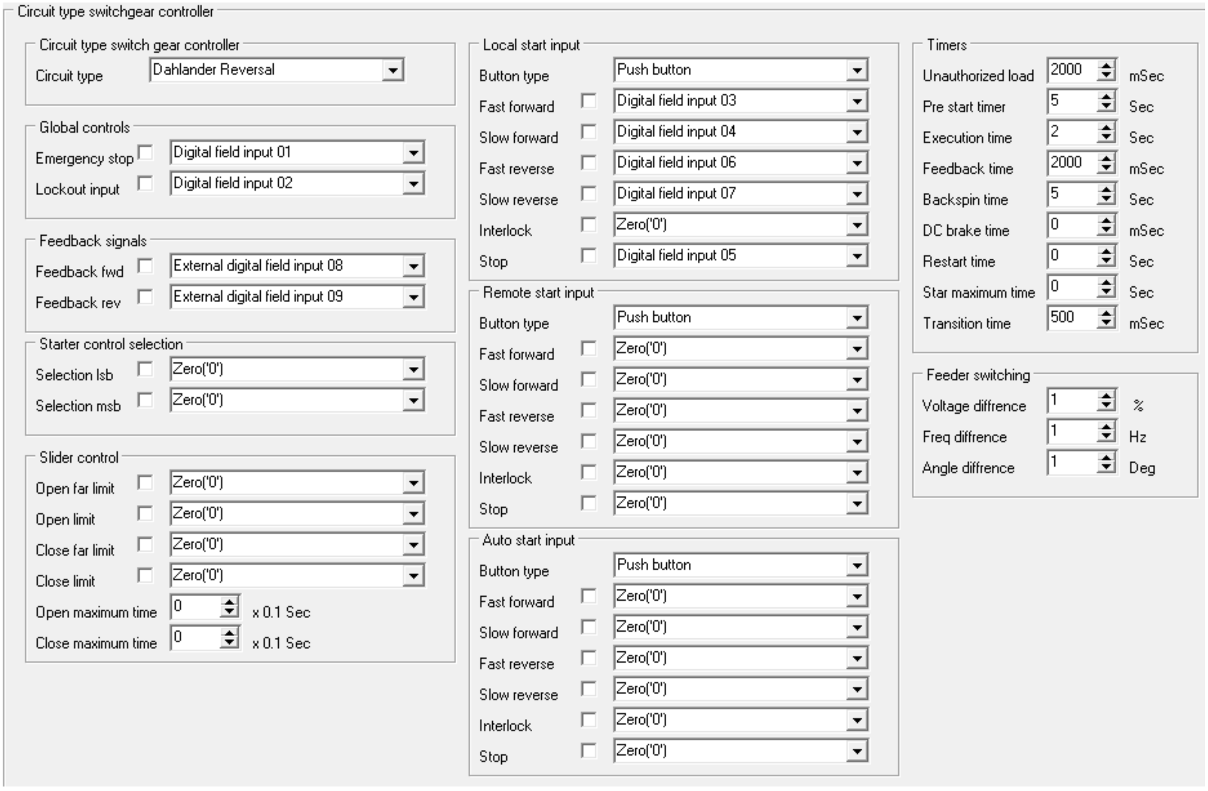
Following motor status flags change:

- SF Motor run 00 => Slow forward contactor
- SF Motor run 01 => Slow reverse contactor
- SF Motor run 02 => Fast forward contactor
- SF Motor run 03 => Fast star contactor
- SF Motor run 04 => Fast reverse star contactor

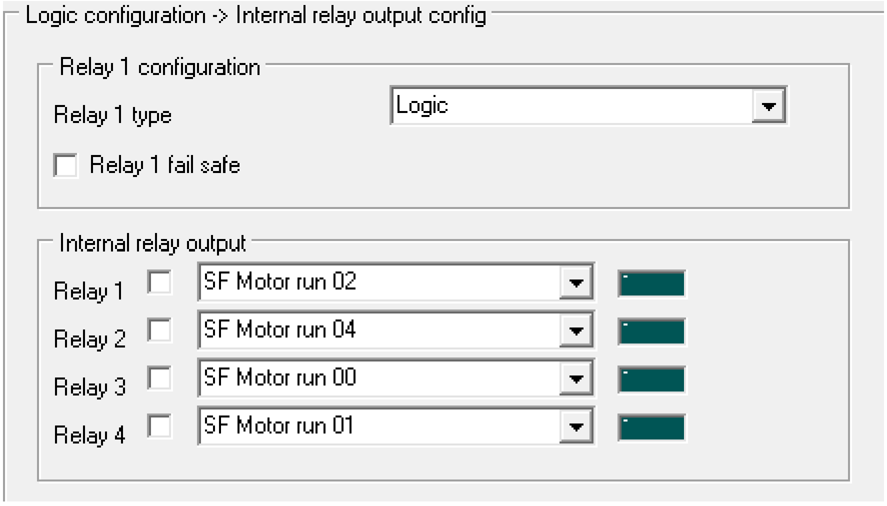
!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the star and slow speed contactor.

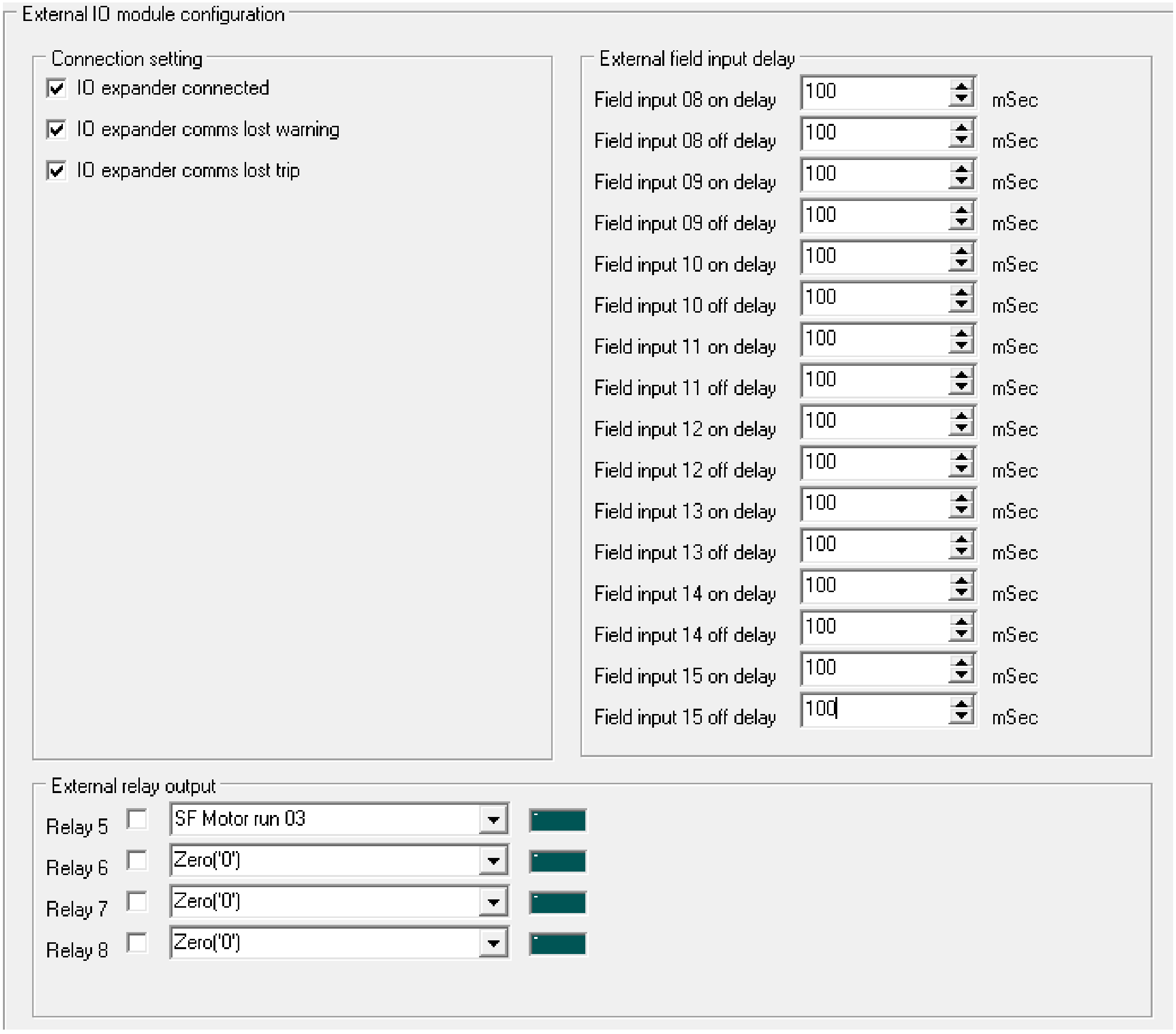
Application:

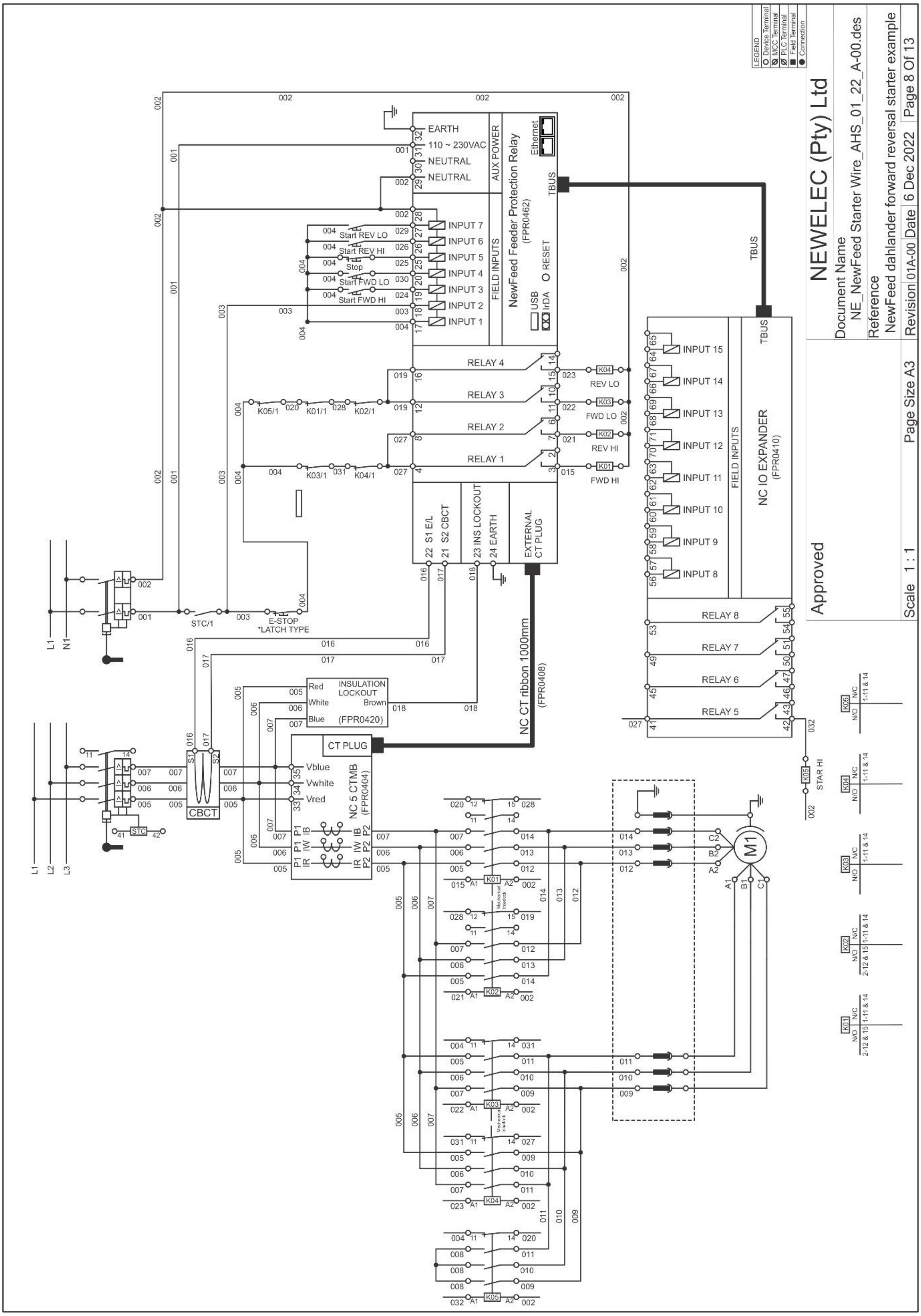
Switchgear panels.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


Logic configuration -> Internal relay output config
Relay 1 configuration
Relay 1 type
Logic
Relay 1 fail safe
Internal relay output
Relay 1
SF Motor run 02
Relay 2
SF Motor run 04
Relay 3
SF Motor run 00
Relay 4
SF Motor run 01


External IO module configuration
Connection setting
IO expander connected
IO expander comms lost warning
IO expander comms lost trip
External field input delay
Field input 08 on delay 100 mSec
Field input 08 off delay 100 mSec
Field input 09 on delay 100 mSec
Field input 09 off delay 100 mSec
Field input 10 on delay 100 mSec
Field input 10 off delay 100 mSec
Field input 11 on delay 100 mSec
Field input 11 off delay 100 mSec
Field input 12 on delay 100 mSec
Field input 12 off delay 100 mSec
Field input 13 on delay 100 mSec
Field input 13 off delay 100 mSec
Field input 14 on delay 100 mSec
Field input 14 off delay 100 mSec
Field input 15 on delay 100 mSec
Field input 15 off delay 100 mSec
External relay output
Relay 5
SF Motor run 03
Relay 6
Zero('0')
Relay 7
Zero('0')
Relay 8
Zero('0')


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed dahlander forward reversal starter example
Revision 01A-00
Date 6 Dec 2022
Page 8 Of 13
Page Size A3
Scale 1 : 1
Approved
NewFeed Feeder Protection Relay
(FPR0462)
NC IO EXPANDER
(FPR0410)
NC CT ribbon 1000mm
(FPR0408)
NC 5 CTMB
(FPR0404)
INSULATION LOCKOUT
(FPR0420)

Parameters:

Circuit type – Dahlander reversal starter		
Parameter	**Range**	**Description**
Circuit type	6 = Dahlander Reversal Starter	Configure circuit type as a star delta reversal switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the forward slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Feedback rev	Logic lookup table for selected input. Default: Zero.	Indicate the state of the reverse slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Local start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Local start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.

Circuit type – Dahlander reversal starter		
Parameter	**Range**	**Description**
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Remote start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Remote start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Auto start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Auto start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.

Circuit type – Dahlander reversal starter		
Parameter	**Range**	**Description**
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Transition time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Gap time to let the motor slow down before activating the slow speed to prevent shaft twist. 0 milli Sec disables this feature.

29.8 Type – Pole-Changing

Description:

Designed for a pole changing motor.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Fast forward => Start switchgear with fast pole
- Slow forward => Start switchgear with slow pole
- Interlock => Interlock
- Stop => Stop

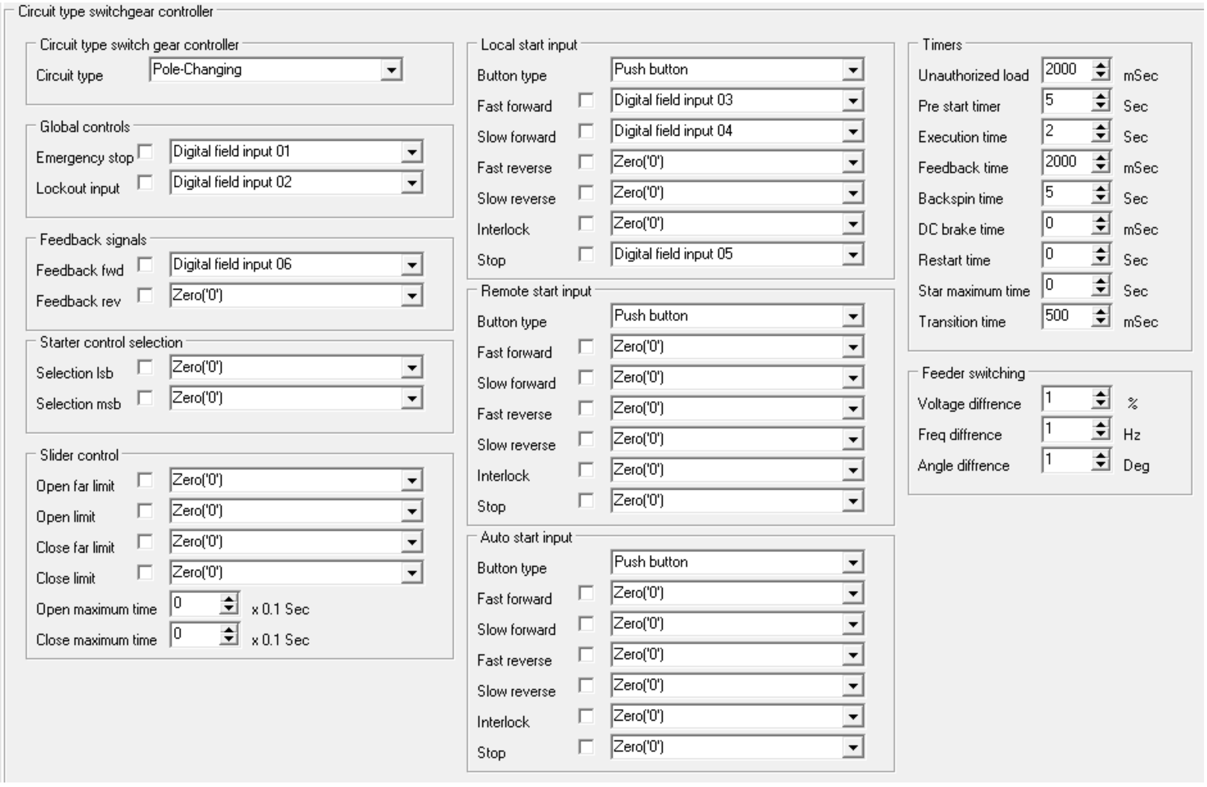
Following motor status flags change:

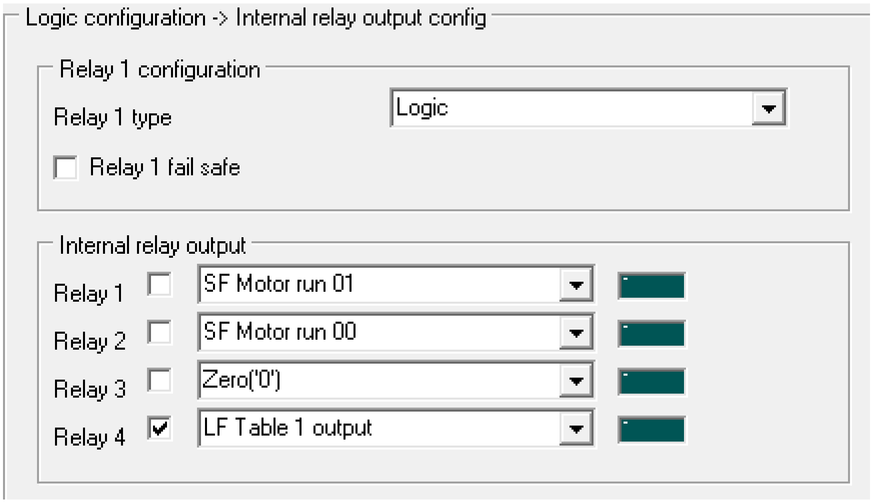
- SF Motor run 00 => Slow contactor
- SF Motor run 01 => Fast contactor

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the fast and slow speed contactor.

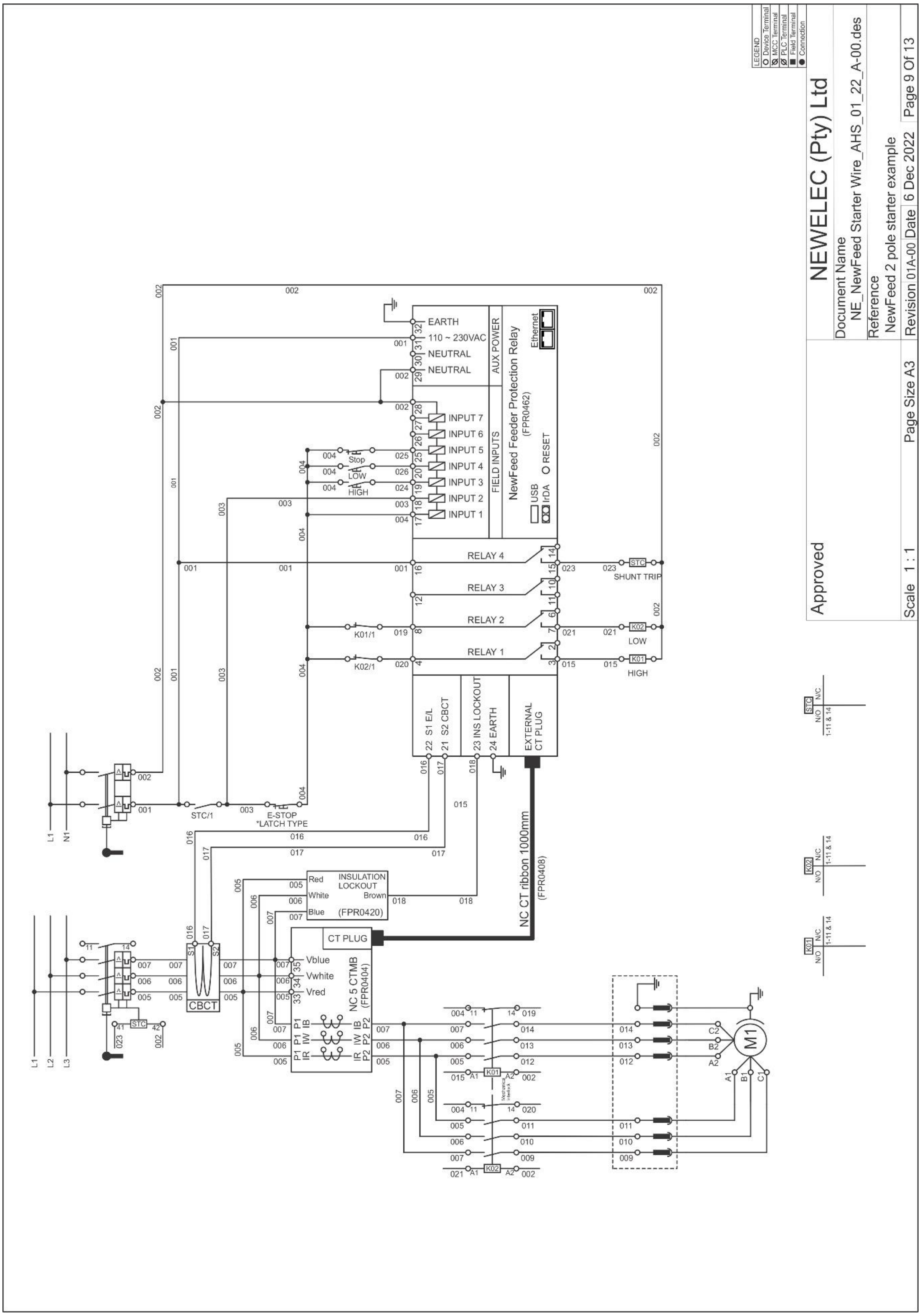
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed 2 pole starter example
Revision 01A-00
Date 6 Dec 2022
Page 9 Of 13
Approved
Page Size A3
Scale 1 : 1
LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Ethernet
USB
IrDA
RESET
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
LOW
HIGH
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL
CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION
LOCKOUT
(FPR0420)
CT PLUG
NC 5 CTMB
(FPR0404)
Vblue
Vwhite
Vred
CBCT
STC/1
E-STOP
*LATCH TYPE
K01/1
K02/1
Stop
LOW
HIGH
M1

Parameters:

Circuit type – Pole-Changing starter		
Parameter	**Range**	**Description**
Circuit type	7 = Pole-Changing Starter	Configure circuit type as a two pole switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.

Circuit type – Pole-Changing starter		
Parameter	**Range**	**Description**
Remote start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a fast start command to the starter logic.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a slow start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.

Circuit type – Pole-Changing starter		
Parameter	**Range**	**Description**
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Transition time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Gap time to let the motor slow down before activating the slow speed to prevent shaft twist. 0 milli Sec disables this feature.

29.9 Type – Pole-Changing reversal

Description:

Designed for a pole changing.

!!!! WARNING !!!!	
	IO expander module will be needed for Dahlander reversal configuration.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward and reverse
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

- Fast forward => Start switchgear fast forward/clock wise
- Slow forward => Start switchgear slow forward/clock wise
- Fast reverse => Start switchgear fast reverse/anti clock wise
- Slow reverse => Start switchgear slow reverse/anti clock wise
- Interlock => Interlock
- Stop => Stop

Following motor status flags change:

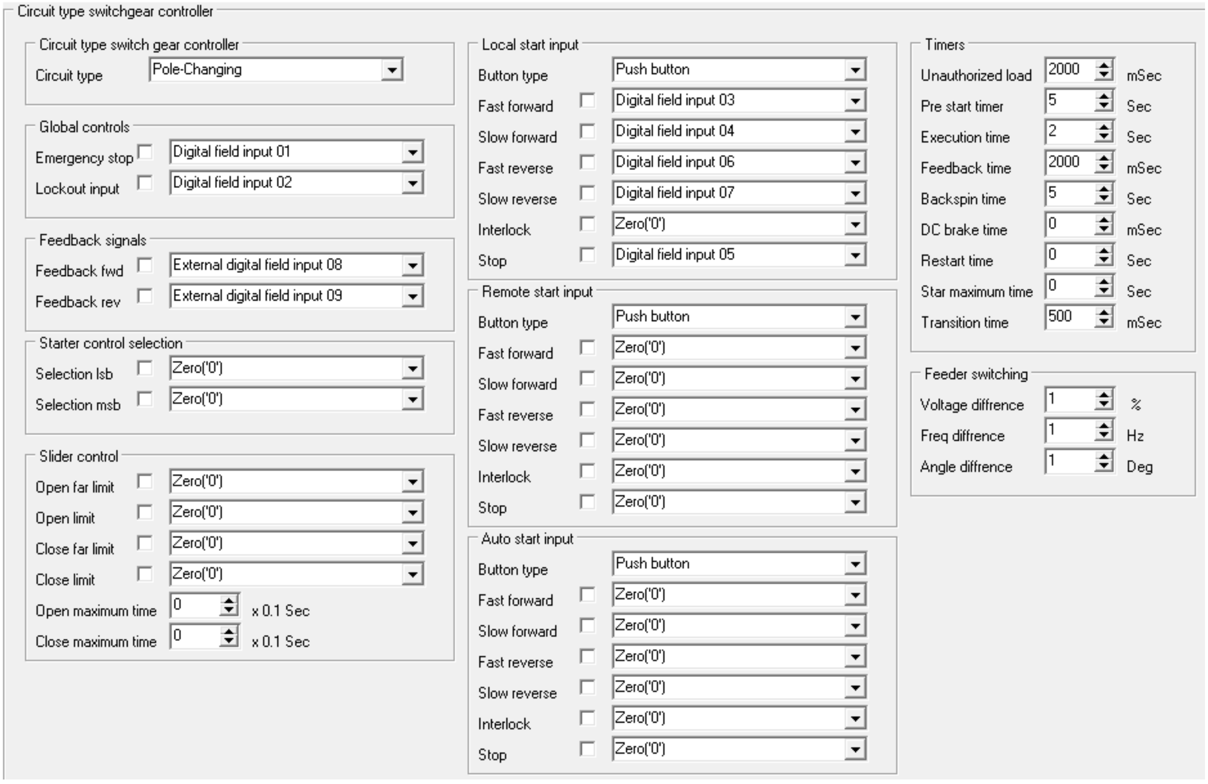
- SF Motor run 00 => Slow forward contactor
- SF Motor run 01 => Fast forward contactor
- SF Motor run 02 => Slow reverse contactor
- SF Motor run 03 => Fast reverse contactor

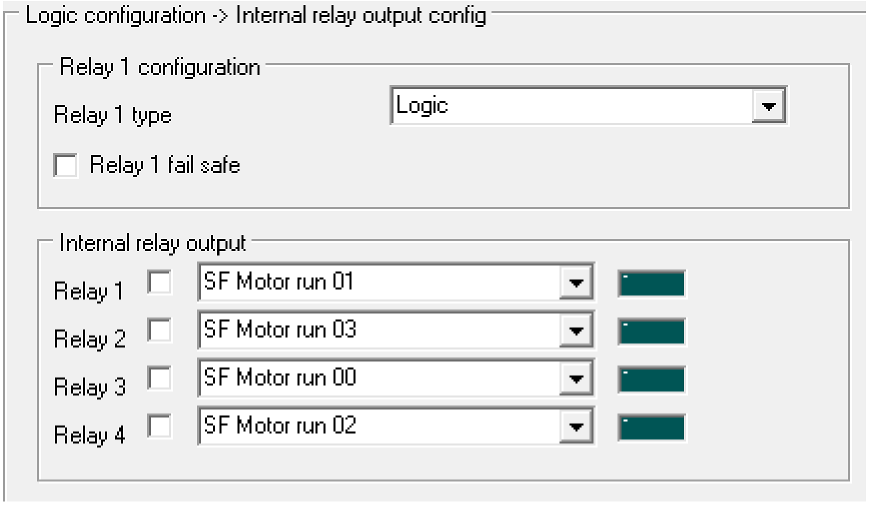
!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the fast and slow speed contactor.

!!!! WARNING !!!!	
	Always make use of a mechanical interlock between the forward and reverse contactor.

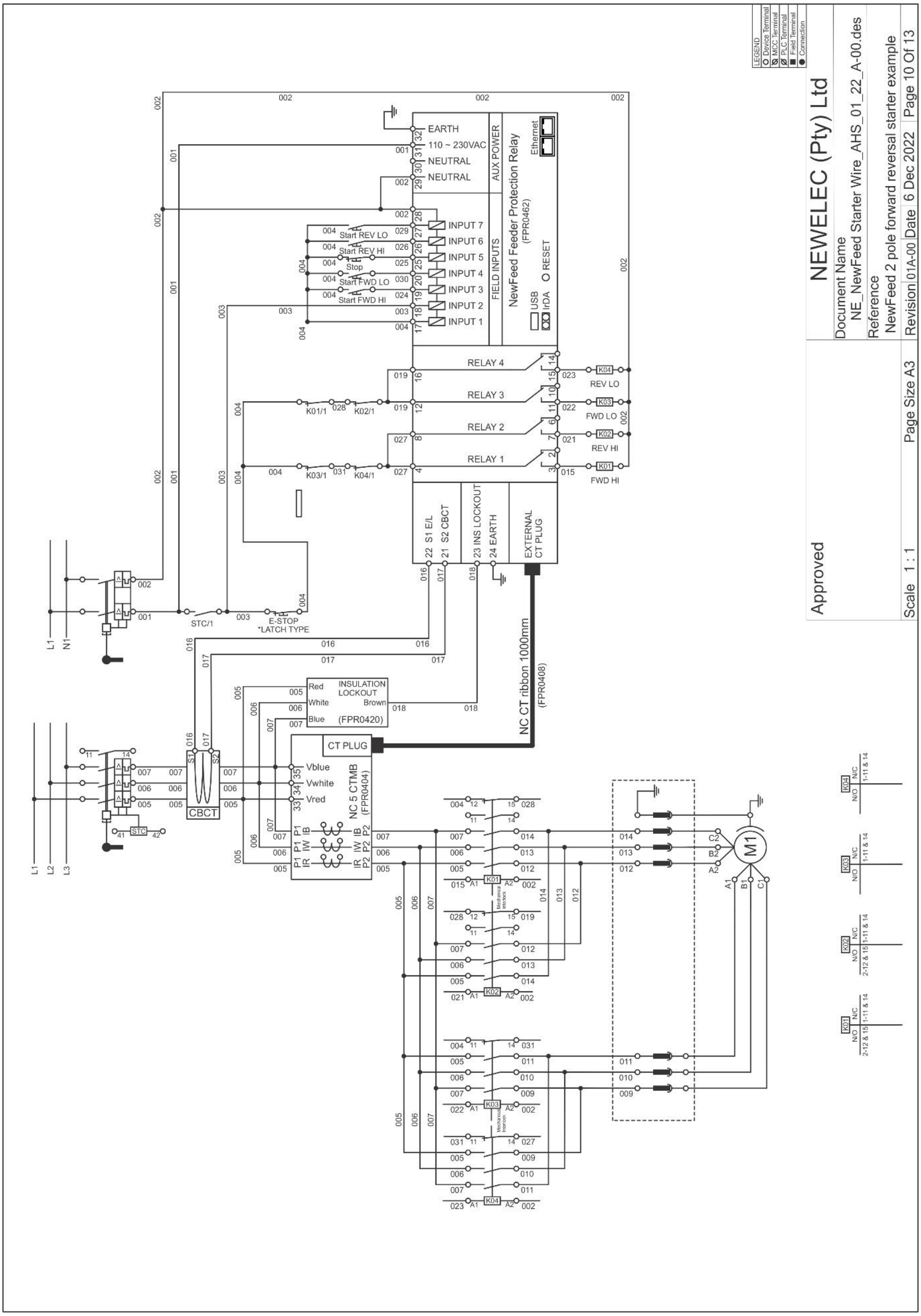
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed 2 pole forward reversal starter example
Revision 01A-00 Date 6 Dec 2022 Page 10 Of 13
Approved
Scale 1 : 1 Page Size A3
LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Start REV LO
Start REV HI
Stop
Start FWD LO
Start FWD HI
RELAY 4
RELAY 3
RELAY 2
RELAY 1
REV LO
FWD LO
REV HI
FWD HI
Ethernet
USB
IrDA
RESET
22 S1 E/L
21 S2 CBCT
23 INS LOCKOUT
24 EARTH
EXTERNAL CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION LOCKOUT
(FPR0420)
Red
White
Blue
Brown
CT PLUG
NC 5 CTMB
(FPR0404)
Vblue
Vwhite
Vred
CBCT
STC/1
E-STOP
*LATCH TYPE
Mechanical Interlock
M1
L1
N1
L2
L3

Parameters:

Circuit type – Pole-Changing reversal starter		
Parameter	**Range**	**Description**
Circuit type	6 = Dahlander Reversal Starter	Configure circuit type as a star delta reversal switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the forward slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Feedback rev	Logic lookup table for selected input. Default: Zero.	Indicate the state of the reverse slow and fast contactor wired in parallel. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Local start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Local start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.

Circuit type – Pole-Changing reversal starter		
Parameter	**Range**	**Description**
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Remote start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Remote start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input fast forward	Logic lookup table for selected input. Default: Zero.	Give a forward fast start command to the starter logic.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward slow start command to the starter logic.
Auto start input fast reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse fast start command to the starter logic.
Auto start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse slow start command to the starter logic.

Circuit type – Pole-Changing reversal starter		
Parameter	**Range**	**Description**
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.
Transition time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Gap time to let the motor slow down before activating the slow speed to prevent shaft twist. 0 milli Sec disables this feature.

29.10 Type – Soft starter

Description:

Soft starter configuration works with a soft starter. But the start stop should be setup as a latch type input on the soft starter. Please see the soft starter used manual for reference to configure the remote start as a latch type start. SF Motor run 03 can also be used to drive a contactor that feeds into the soft starter.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

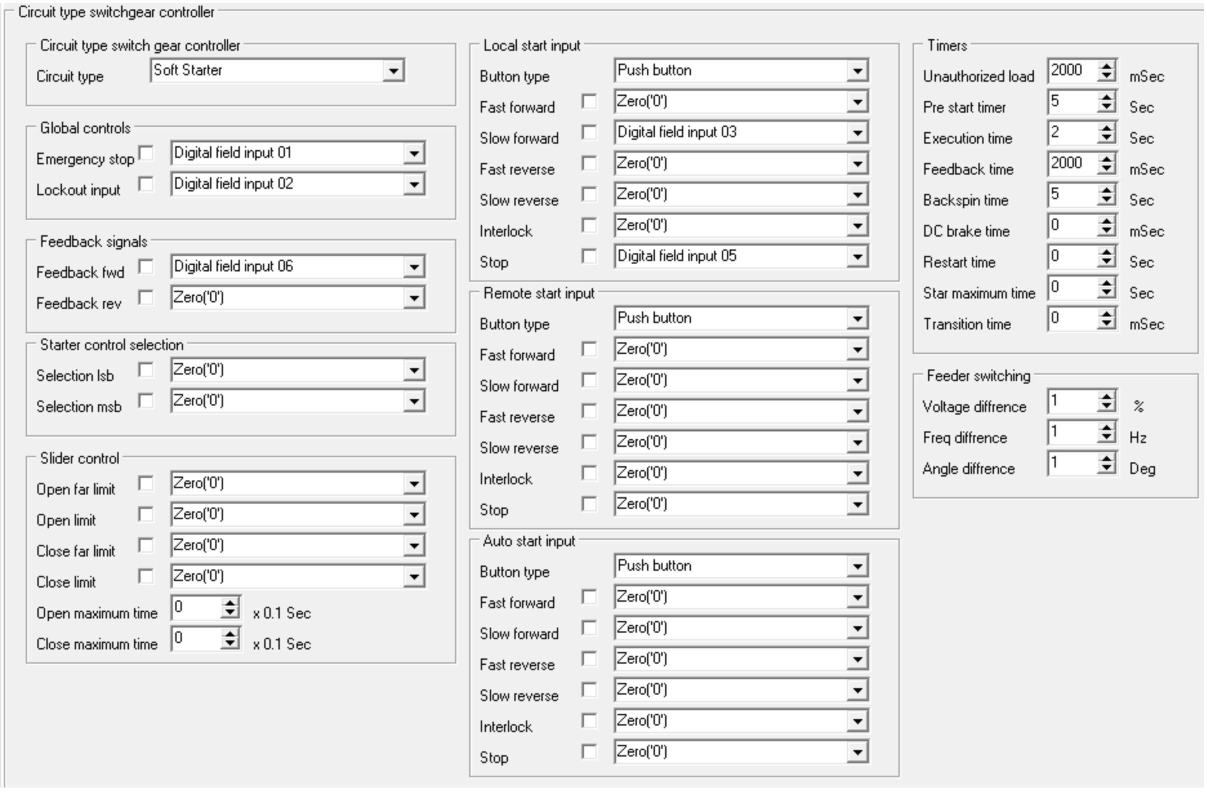
- Slow forward => Start switchgear
- Interlock => Interlock
- Stop => Stop

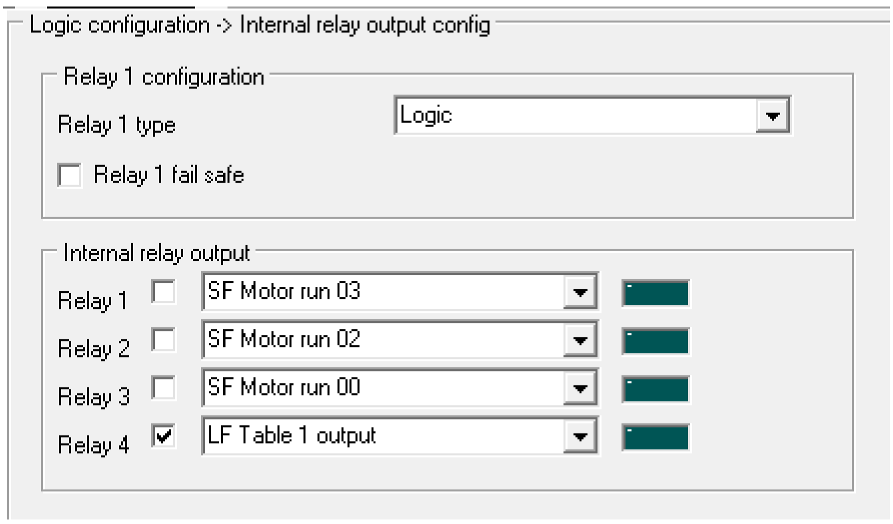
Following motor status flags change:

- SF Motor run 00 => Soft starter start
- SF Motor run 02 => Reset pulse contactor
- SF Motor run 03 => Soft starter supply contactor

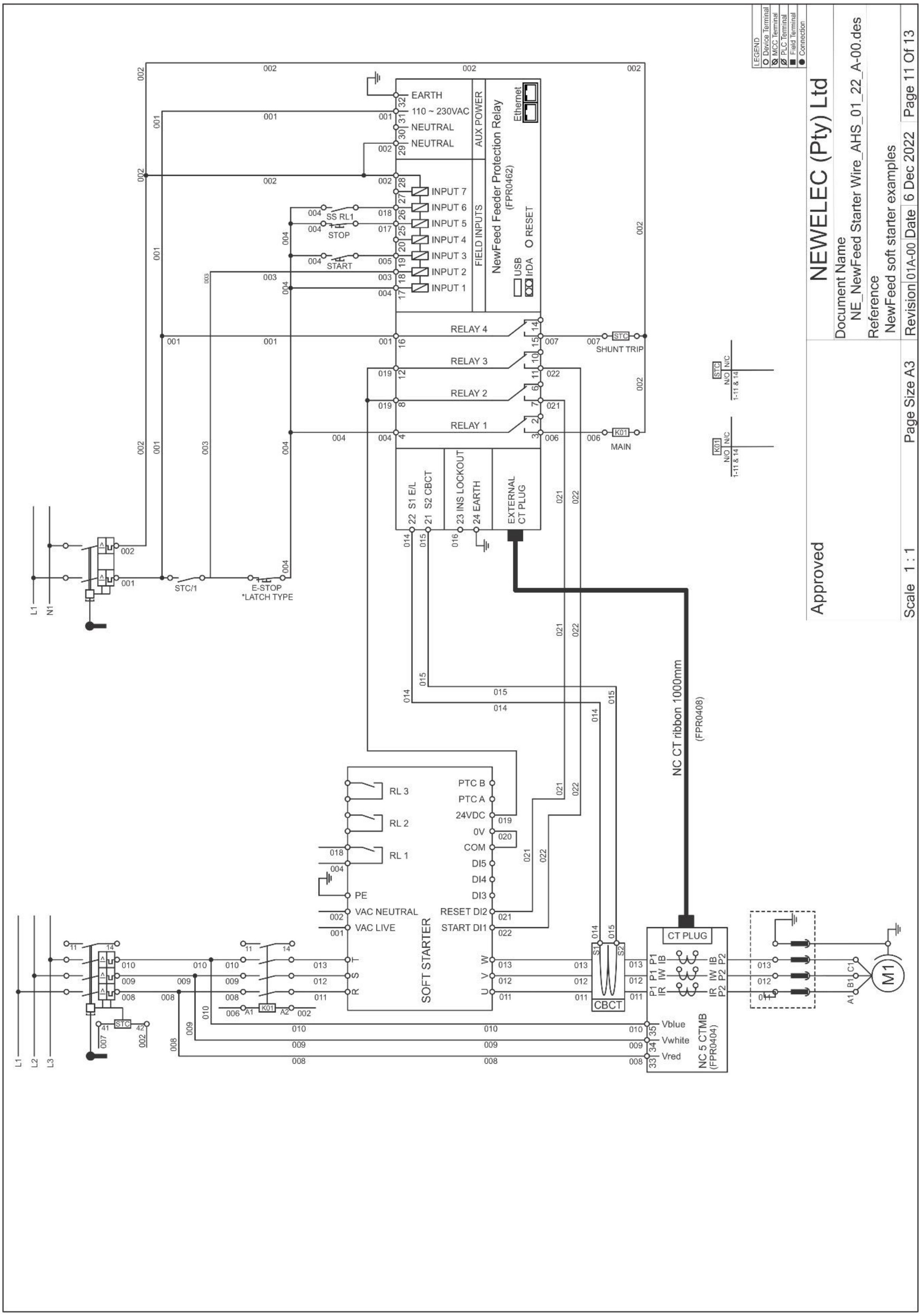
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 



NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Ethernet
USB
IrDA
RESET
RELAY 4
RELAY 3
RELAY 2
RELAY 1
SHUNT TRIP
MAIN
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL CT PLUG
SS RL1
STOP
START
STC/1
E-STOP
*LATCH TYPE
NC CT ribbon 1000mm
(FPR0408)
SOFT STARTER
RL 3
RL 2
RL 1
PTC B
PTC A
24VDC
0V
COM
DI5
DI4
DI3
RESET DI2
START DI1
PE
VAC NEUTRAL
VAC LIVE
CBCT
CT PLUG
Vblue
Vwhite
Vred
NC 5 CTMB
(FPR0404)
M1
LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed soft starter examples
Revision 01A-00
Date 6 Dec 2022
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Approved
Scale 1 : 1

Parameters:

Circuit type – Soft starter		
Parameter	**Range**	**Description**
Circuit type	9 = Soft starter	Configure circuit type as a soft starter switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the main contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.

Circuit type – Soft starter		
Parameter	**Range**	**Description**
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.

Circuit type – Soft starter		
Parameter	**Range**	**Description**
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.

29.11 Type – Soft reversal starter

Description:

Soft starter configuration works with a soft starter. But the start stop should be setup as a latch type input on the soft starter. Please see the soft starter used manual for reference to configure the remote start as a latch type start. SF Motor run 03 can also be used to drive a contactor that feeds into the soft starter.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward and reverse
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

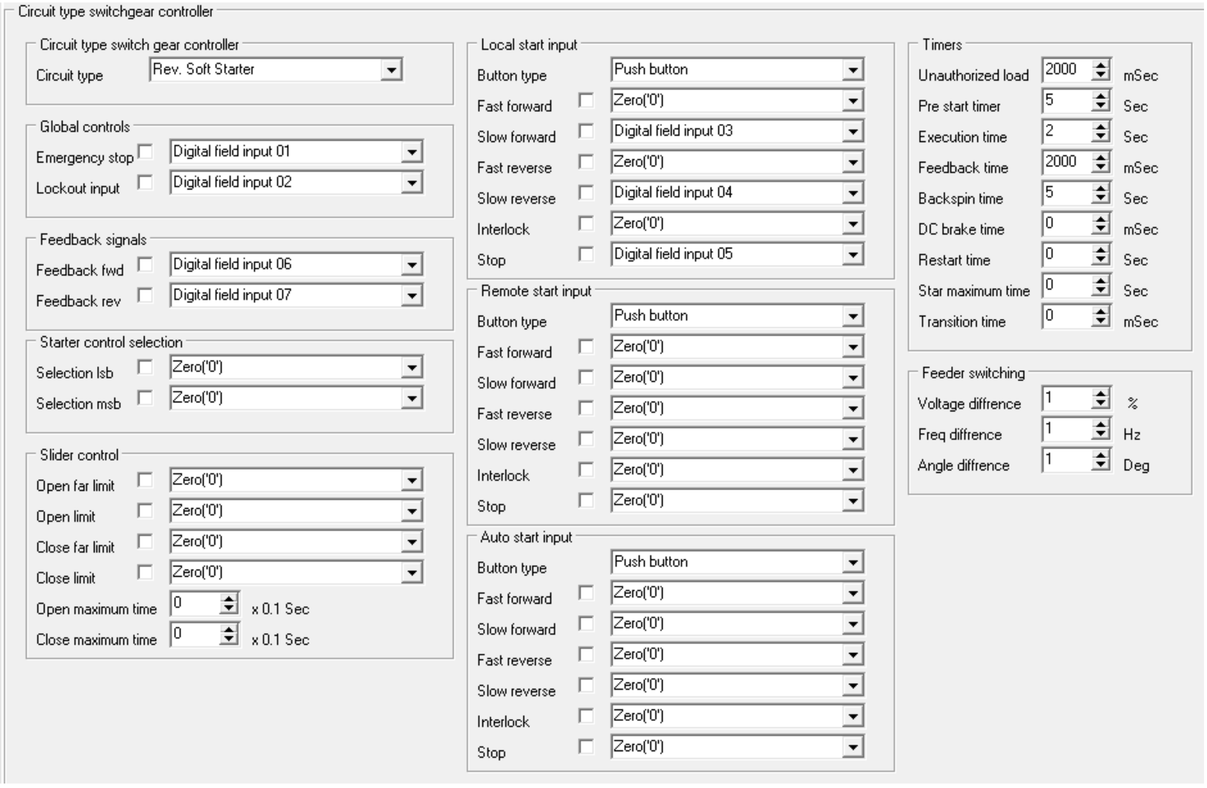
- Slow forward => Start switchgear forward/clock wise
- Slow reverse => Start switchgear reverse/anti clock wise
- Interlock => Interlock
- Stop => Stop

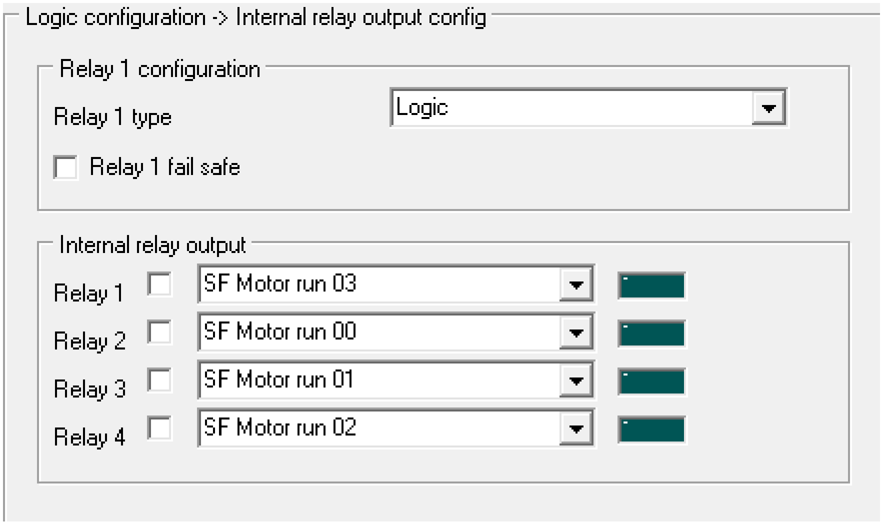
Following motor status flags change:

- SF Motor run 00 => Soft starter Forward
- SF Motor run 01 => Soft starter Reverse
- SF Motor run 02 => Reset pulse contactor
- SF Motor run 03 => Soft starter supply contactor

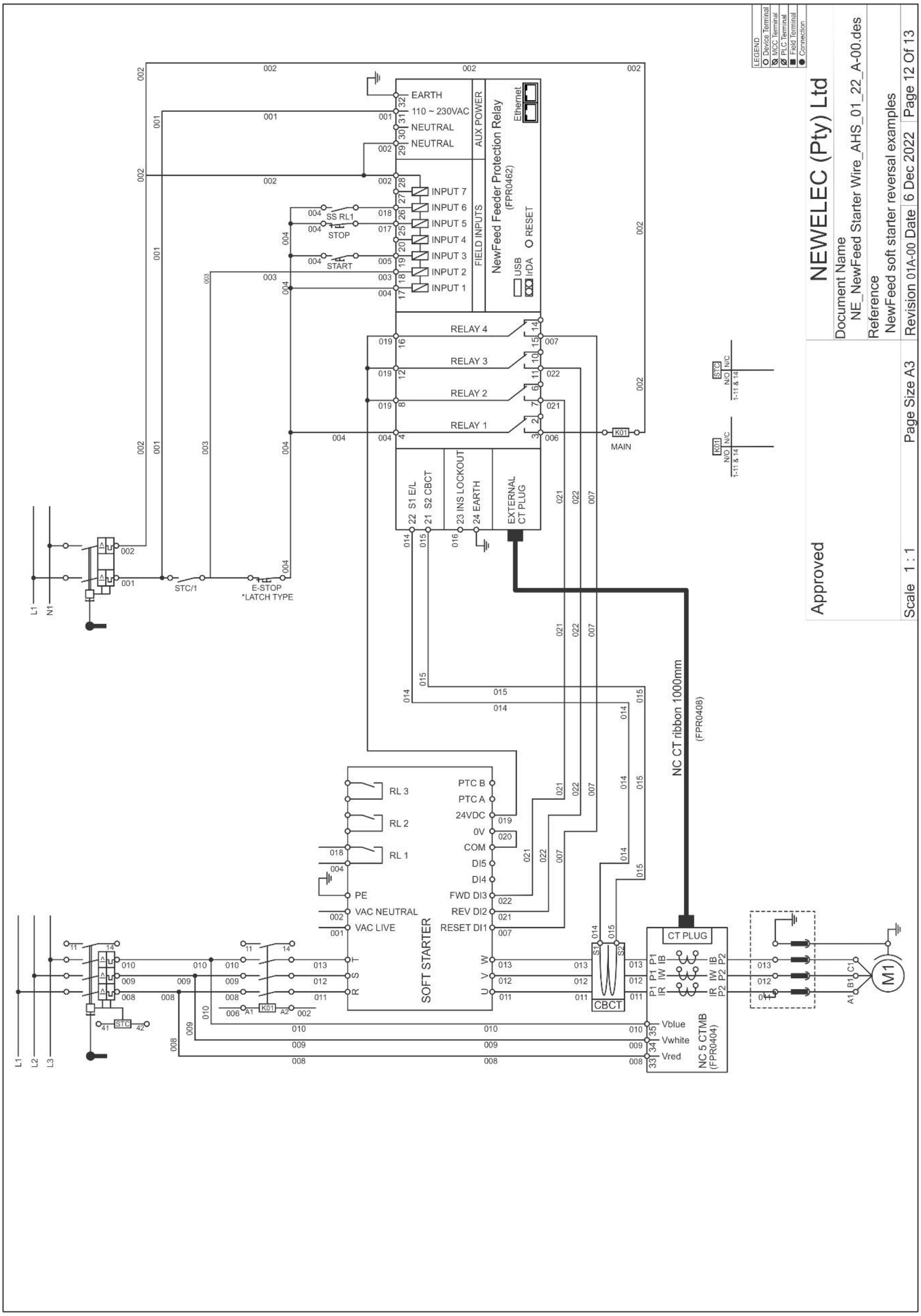
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 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Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed soft starter reversal examples
Revision 01A-00 Date 6 Dec 2022 Page 12 Of 13
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Approved
Scale 1 : 1
LEGEND
Device Terminal
MCC Terminal
PLC Terminal
Field Terminal
Connection
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
NEUTRAL
INPUT 7
INPUT 6
INPUT 5
INPUT 4
INPUT 3
INPUT 2
INPUT 1
Ethernet
USB
IrDA
RESET
RELAY 4
RELAY 3
RELAY 2
RELAY 1
MAIN
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL CT PLUG
SS RL1
STOP
START
STC/1
E-STOP
*LATCH TYPE
NC CT ribbon 1000mm
(FPR0408)
SOFT STARTER
PTC B
PTC A
24VDC
0V
COM
DI5
DI4
FWD DI3
REV DI2
RESET DI1
RL 3
RL 2
RL 1
PE
VAC NEUTRAL
VAC LIVE
CBCT
CT PLUG
Vblue
Vwhite
Vred
NC 5 CTMB
(FPR0404)
M1

Parameters:

Circuit type – Soft reversal starter		
Parameter	**Range**	**Description**
Circuit type	10 = Soft reversal starter	Configure circuit type as a soft reversal starter switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the forward contactor. Zero will disable this feature and Current present CTMB01 will be used.
Feedback rev	Logic lookup table for selected input. Default: Zero.	Indicate the state of the reverse contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Local start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.

Circuit type – Soft reversal starter		
Parameter	**Range**	**Description**
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Remote start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a forward start command to the starter logic.
Auto start input slow reverse	Logic lookup table for selected input. Default: Zero.	Give a reverse start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.

Circuit type – Soft reversal starter		
Parameter	**Range**	**Description**
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.

29.12 Type – OCB DOL starter

Description:

OCB is used with an OCB contactor. Generally, an OCB only has a trip input that accepts a pulse to trip the OCB. But on some OCB a start pulse can be used to reset the OCB trip.

When selected the following features are activated:

- Emergency stop
- Lockout input
- Feedback forward
- Start control selection
- Slider control operates as a limit interlock
- All start inputs
- Timers

Following start control change:

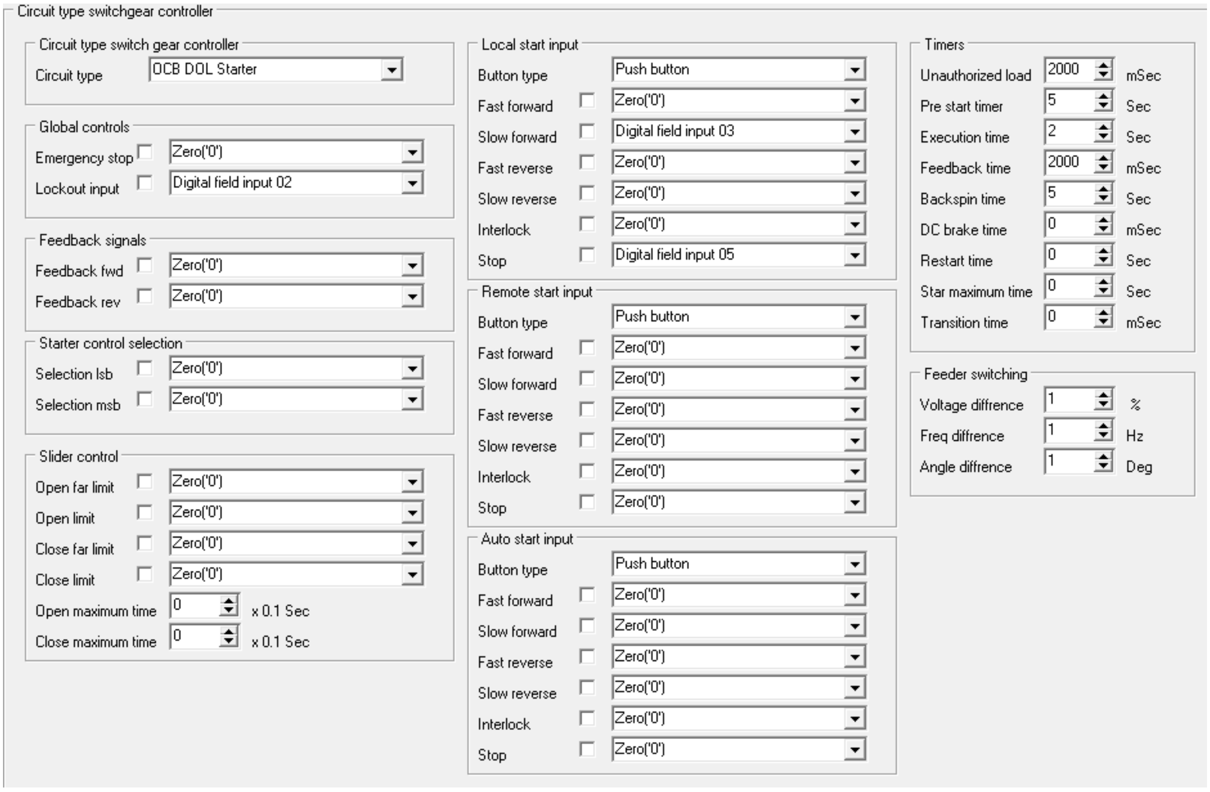
- Slow forward => Start switchgear
- Interlock => Interlock
- Stop => Stop

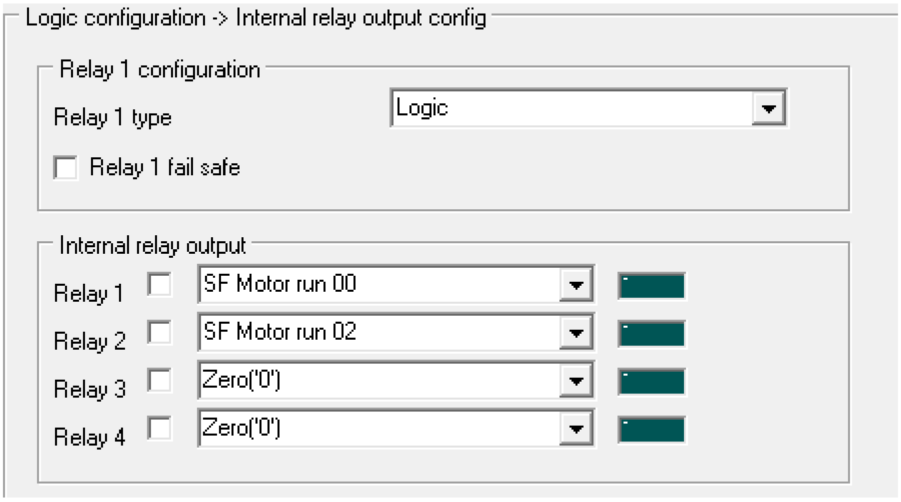
Following motor status flags change:

- SF Motor run 00 => ON pulse contactor (500 milli Sec)
- SF Motor run 01 => OFF pulse contactor (500 milli Sec)
- SF Motor run 02 => Reset pulse contactor (500 milli Sec)

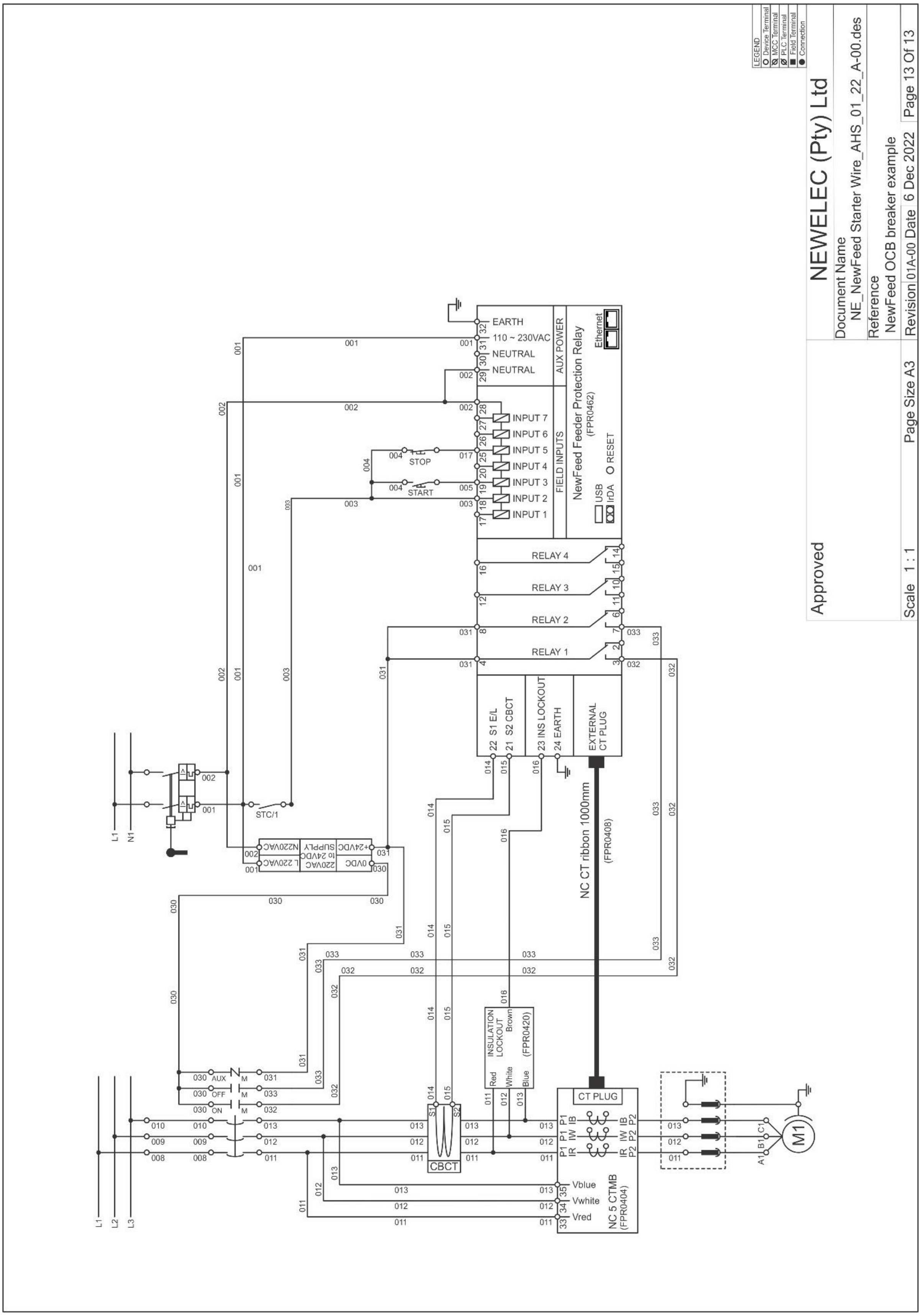
Application:

Switchgear panels.





NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 


NEWELEC (Pty) Ltd
Document Name
NE_NewFeed Starter Wire_AHS_01_22_A-00.des
Reference
NewFeed OCB breaker example
Revision 01A-00 Date 6 Dec 2022 Page 13 Of 13
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Scale 1 : 1 Page Size A3
NewFeed Feeder Protection Relay
(FPR0462)
AUX POWER
FIELD INPUTS
EARTH
110 ~ 230VAC
NEUTRAL
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
RELAY 1
RELAY 2
RELAY 3
RELAY 4
STOP
START
STC/1
S1 E/L
S2 CBCT
INS LOCKOUT
EARTH
EXTERNAL CT PLUG
NC CT ribbon 1000mm
(FPR0408)
INSULATION LOCKOUT
(FPR0420)
CBCT
CT PLUG
NC 5 CTMB
(FPR0404)
Vblue
Vwhite
Vred
M1
USB
IrDA
RESET
Ethernet

Parameters:

Circuit type – OCBD starter		
Parameter	**Range**	**Description**
Circuit type	11 = OCB DOL starter	Configure circuit type as an oil circuit breaker switchgear controller.
Emergency stop	Logic lookup table for selected input. Default: Zero.	Emergency stop is an active low signal. Zero will disable this feature.
Lockout input	Logic lookup table for selected input. Default: Zero.	Lockout active is an active low signal. Zero will disable this feature.
Feedback fwd	Logic lookup table for selected input. Default: Zero.	Indicate the state of the main contactor. Zero will disable this feature and Current present CTMB01 will be used.
Starter control selection lsb, msb	Logic lookup table for selected input. Default: Zero.	Select which start inputs will control the switchgear. 00 = Local 01 = Remote 10 = Auto
Local start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Local start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Local start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Local start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Remote start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Remote start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Remote start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.

Circuit type – OCBD starter		
Parameter	**Range**	**Description**
Remote start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Auto start input button type	• 0 = Push button • 1 = Hold till start • 2 = Latch button Default: 0 = Push button	Type of button configuration.
Auto start input slow forward	Logic lookup table for selected input. Default: Zero.	Give a start command to the starter logic.
Auto start input interlock	Logic lookup table for selected input. Default: Zero.	Interlock to indicate that other depended switchgears are active. Active low signal.
Auto start input stop	Logic lookup table for selected input. Default: Zero.	Give a stop command to the starter logic. Active low signal.
Unauthorized load	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time till tripping MCCB if load and feedback signal clears after a trip condition. 0 milli Sec disables this feature.
Pre start timer	0 – 999 Sec (1 Sec) Default: 0 Sec	Amount of time that the pre start warning flag stays active before starting switch gear. 0 Sec Disables this feature.
Execution time	1 – 10 Sec (1 Sec) Default: 5 Sec	Time till a start command requires a feedback signal.
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Maximum time to allow the feedback signal to dip before stopping the switchgear due to feedback signals not active.
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Gives the device time to come to a standstill before the next start command is given. Typically, time needed to change the direction that a motor was turning. 0 Sec Disables this feature.

Circuit type – OCBD starter		
Parameter	**Range**	**Description**
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 2000 milli Sec	Inject a DC voltage onto the mains to aid stopping the motor faster. 0 milli Sec disables this feature.

29.13 Starter button input type

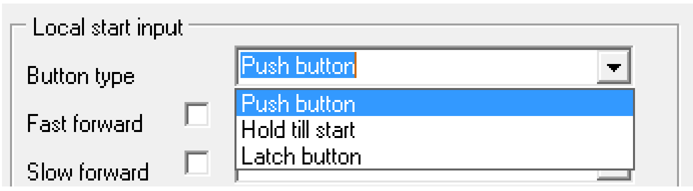
Description:

Defines the type of buttons are connected to that starter controller.

- Push button
    - Button is a push button type.
- Hold till start
    - Push button type.
    - Button must be held down till drive starts.
- Latch button
    - Button is a latch type.
    - If the button goes open then will be seen as a stop.

Application:

Used in any switch gear panel.



Parameters:

Starter button input type		
Parameter	**Range**	**Description**
Local button type	• Push Button • Hold till start • Latch button Default: Push button	Local control signal type of start buttons.
Remote button type	• Push Button • Hold till start • Latch button Default: Push button	Remote control signal type of start buttons.
Auto button type	• Push Button • Hold till start • Latch button Default: Push button	Auto control signal type of start buttons.

29.14 Emergency stop

Description:

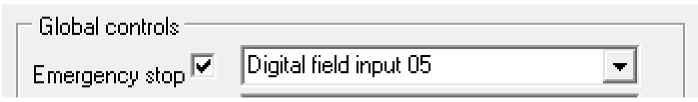
Emergency stop is a trip monitor circuit. The emergency stop signal must be active high. Selecting the flag "**Zero ('0')**" will cancel the emergency stop input selection.

!!!! WARNING !!!!	
	Emergency stops must always be hard wired. NewFeed will only indicate and react to the emergency stop. But for safety of personal it is important to wire the emergency stop to cut off power to the switch gear control contactor.

!!!! WARNING !!!!	
	Emergency stop is an active low signal. This is to make sure that in the case of a wire breakage that the switch gear remains safe.

Application:

The E-stop is critically important, and is often mounted physically next the protected equipment itself where there is clear line of sight.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Emergency stop		
Parameter	**Range**	**Description**
Emergency stop input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for emergency stop that must be active high.

29.15 Lockout

Description:

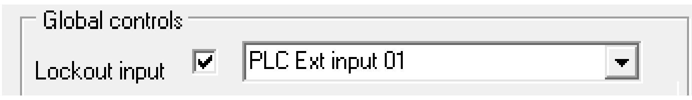
When maintenance is needed on a switch gear then this bit can be set in order to lockout the NewFeed to start the switch gear. The starter logic will be lockout and will not start the switch gear.

The lockout signal is an active low.

!!!! WARNING !!!!	
	Lockout is an active low signal. This is to make sure that in the case of a wire breakage that the switch gear remains safe.

Application:

This could be a PLC generated bit, to lockout an equipment that needs to be maintained.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Lockout		
Parameter	**Range**	**Description**
Lockout input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for lockout input.

29.16 Unauthorized current

Description:

Protects the switch gear on unauthorized current. Current that goes through the main contactor of the switch gear without a start. Setting the unauthorized current to 0 will disable this feature.

On starter type protection. The stop inputs can be set and used to detect unauthorized current on a protection configured starter.

Unauthorized current is active for all other starter types as for protection, except that the unauthorized current also activates if a start command has not been executed.

Unauthorized current works on the “**In Service**”, “**Feedback Forward**” and “**Feedback Reverse**” flags.

Application:

It is suitable for applications where there is a chance of in advertent starting or connection of feeder of drive.

Parameters:

Unauthorized current		
Parameter	**Range**	**Description**
Unauthorized current delay	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Unauthorized current trip delay. 0 milli Sec disables this feature.

29.17 Starter control selection

Description:

Multiple starter control inputs from different parts of the switch gear can stop and start the switch gear.

3 starter locations have been added to the starter controller, local, remote and auto.

Local starter location can be door type buttons. Least Significant Bit (LSB) and Most Significant Bit (MSB) must be set to 00.

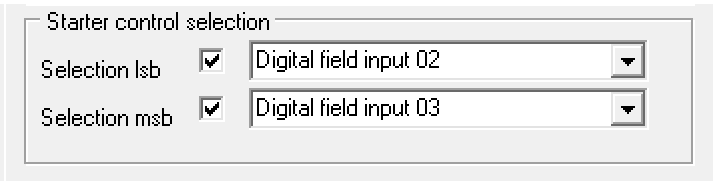
Remote starter location can be field type buttons. LSB be set 1 and MSB must be set to 0.

Auto can be SCADA type. MSB be set 0 and MSB must be set to 1.

!!!! WARNING !!!!	
	When changing starter location control then the starter controller will stop the drive.

Application:

This is crucial safety interlocking – so start can only be effected at the right place. However, the Starter Stop works at any location.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Starter control selection		
Parameter	**Range**	**Description**
Starter input selection lsb	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input selection lsb.
Starter input selection msb	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input selection msb.

29.18 Starter controller input

Description:

Input control to the starter controller selected on the starter control selection, local, remote and auto.

These inputs can be broken up into 3 categories start, stop and interlock:

Start

Start has 4 direction of control that can take place depending on the starter type selection.

- Fast forward
  - High speeds forward of starter logic.
  - When selected then maximum load 2, thermal curve 2 and thermal reset curve 2 settings will be used.
- Slow forward
  - Slow speeds forward of starter logic.
  - When selected then maximum load 1, thermal curve 1 and thermal reset curve 1 settings will be used.
  - These settings are also used on the protection configuration.
- Slow reverse
  - Slow speeds reverse of starter logic.
  - When selected then maximum load 1, thermal curve 1 and thermal reset curve 1 settings will be used.
- Fast reverse
  - High speeds reverse of starter logic.
  - When selected then maximum load 2, thermal curve 2 and thermal

To deactivate a stop from the starter controller then set the stop input to “**Zero (‘0’)**”.

Stop

Stops are used to stop the switch gear from a running condition. Stop inputs are active high and is a AND condition. Does not matter what the starter control selection is set on if one stop is logic low then the starter controller will stop the drive.

To deactivate a stop from the starter controller then set the stop input to “**Zero (‘0’)**”.

!!!! WARNING !!!!	
	Stops must be wired active low.
	Any stop going low will stop the starter controller irrespective of start selected position. Local, remote and PLC stop is always active. Stops mapped to input flag “**Zero (‘0’)**” will be excluded from check.

Interlock

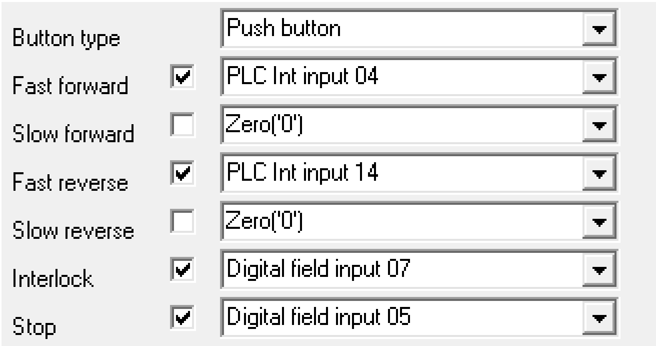
Interlock is also an active high signal to tell the starter controller to keep the switch gear off. But interlock is only working on the selected starter control selection. Local interlock will not lockout a remote or auto starter selection.

To deactivate an interlock from the starter controller then set the stop input to “**Zero (‘0’)**”.

!!!! WARNING !!!!	
	Interlock must be wired active low.

Application:

The specification of the Inputs as explained above should be implemented according to the application at hand. The schematics in section 2 offers more guide on implementation on wiring diagrams.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Starter controller input		
Parameter	**Range**	**Description**
Local start fast forward input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input fast forward for a local starter selection.
Local start slow forward input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input slow forward for a local starter selection.
Local start fast reverse input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input fast reverse for a local starter selection.
Local start slow reverse input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input slow reverse for a local starter selection.
Local interlock input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input stop for a local starter selection. Input must be active high.
Local stop input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input interlock for a local starter selection. Input must be active high and any stop low will stop the starter controller.
Remote start fast forward input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input fast forward for a remote starter selection.
Remote start slow forward input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input slow forward for a remote starter selection.
Remote start fast reverse input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input fast reverse for a remote starter selection.
Remote start slow reverse input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for starter input slow reverse for a remote starter selection.

29.19 Pre start warning timer

Description:

Used to delay a start to give a warning to personal that the switch gear is going to start a section. "**SF Pre start warning**" flag will be set if the starter controller is clear to start the switch gear.

Application:

Used to delay a start to give a warning to personal that the switch gear is going to start a section. "**SF Pre start warning**" flag will be set if the starter controller is clear to start the switch gear.

Parameters:

Pre start warning timer		
Parameter	**Range**	**Description**
Pre start warning time	0 – 999 Sec (1 Sec) Default: 10 Sec	Time since the start command was excepted till the starter controller will start the switch gear.

29.20 Execution time

Description:

Time that the starter controller started the switch gear until load or feedback active goes high. If load or feedback signal does not get detected by the time the execution timer expires then the starter controller will trip on execution time.

Application:

This is necessary to ensure the sequence of events during start up. Therefore, it must be active in all set starters.

Parameters:

Execution time		
Parameter	**Range**	**Description**
Execution time	1 – 10 Sec (1 Sec) Default: 2 Sec	Time frame that the load or feedback signal needs to be detected.

29.21 Feedback time

Description:

Dips can occur on the load or feedback inputs that causes a dip. Instead of the starter controller stops the switch gear the starter controller will wait the feedback time before stopping the starter controller.

Application:

All switch gear types that make use of the feedback signals.

Parameters:

Feedback time		
Parameter	**Range**	**Description**
Feedback time	10 – 2000 milli Sec(10 milli Sec) Default: 500 milli Sec	Time allowed for the load or feedback signal to drop and become active and not stop the starter controller.

29.22 Back spin time

Description:

In some starter type a switch gear might need to wait for the control device to run down or cool down before starting again. Back spin only gets activated when load or feedback signal was active else backspin will not get activated after a stop or trip.

Setting the backspin time to 0 seconds will deactivate the back spin time.

Application:

In a pump with vertical outlet pipe. This helps the water falling due to gravity to settle before another start is attempted.

Parameters:

Back spin time		
Parameter	**Range**	**Description**
Backspin time	0 – 999 Sec (1 Sec) Default: 0 Sec	Time allowed for running down or cooling down.

29.23 DC brake time

Description:

Some switch gear needs to be configured to brake, the device. DC brake down allow the switch gear to apply a brake the application for the amount selected. “**SF DC brake timer active**” can be configured to a relay to switch the brake on.

Setting the DC brake time to 0 milli seconds sill deactivate the DC brake time.

Application:

Any device that needs to stop rotation fast. For an example a drum screen.

Parameters:

DC brake time		
Parameter	**Range**	**Description**
DC brake time	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Amount of time needed to break the device.

29.24 Star delta time

Description:

Only in star delta starter type configuration a maximum time is set for the star contactor to release and the delta contactor to energize. This timer only takes affect when the load in star time does not drop below 100%. When the time expires the starter, controller will force the starter controller to switch in the delta contactor.

Application:

Any star delta configured switch gear.

Parameters:

Star delta time		
Parameter	**Range**	**Description**
Star maximum time	0 – 50 Sec (1 Sec) Default: 0 Sec	Maximum time allowed for the star contactor to be active.

29.25 Feeder switching

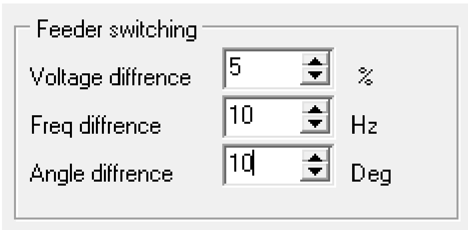
Description:

In feeder protection the voltage, frequency and angle difference between CTMB01 and CTMB02 must not be more than the specified difference before closing the breaker between the 2 systems.

In the event were the two system are not synchronized can cause major damage to the generators and transformers.

Application:

This feature only applies on Feeder protection, and its application is guided by established standards and experience.



Parameters:

Feeder switching		
Parameter	**Range**	**Description**
Feeder voltage difference	1 – 50 % (1 %) Default: 20 %	Percentage voltage difference between the switch gears before switching the contactor.
Feeder frequency difference	1 – 50 Hz (1 Hz) Default: 20 Hz	Voltage frequency difference between the switch gears before switching the contactor.
Feeder angle difference	1 – 50 Deg (1 Deg) Default: 5 Deg	Voltage angle difference between the switch gears before switching the contactor.

29.26 Transition time

Description:

Applies to two speed type switch gears. Time allowed to go from a fast speed to a slow speed allowing the drive to slow down a bit before activating the slow speed contactor. This allows going to a slower speed without going through a start up cycle again.

This feature is disabled when the time is set to 0.

Application:

Any two speed type switch gear systems.

Parameters:

Transition time		
Parameter	**Range**	**Description**
Transition time	0 – 2000 milli Sec(10 milli Sec) Default: 0 milli Sec	Time to allow to slow down before the switch gear slow speed contactor energize.

29.27 Slider configuration

Description:

Used to monitor the limits of a moveable device connected to the switch gear where the limits must be monitored.

For the starter controller to use the slider configuration the switch gear must have limit switched.

The moveable part can be a gate, valve, etc.

Setting the slider input to **'Zero ('0')'** will deactivate that input.

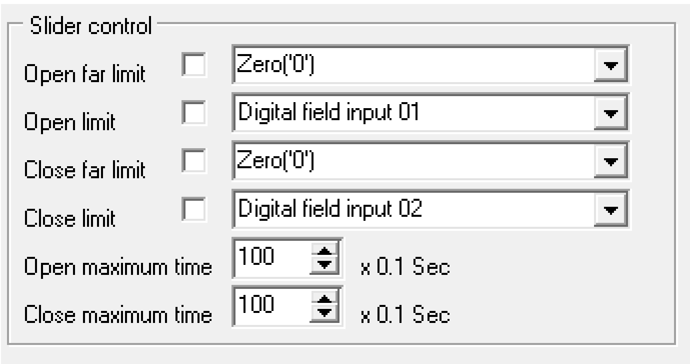
Slider configurations consist of the following configuration for the limit inputs:

Slider configuration	Close limit far	Close limit	Open limit	Open limit far
Inner limit		X	X	
All limits	X			X
Close with open limit	X	X	X	
Close with close limit		X	X	X

Backup for the open and closing a timer limit can be assigned. The time limit will just indicate that the limit switch should have reacted or changed by now as the moveable device reached its limit.

Application:

Any mechanical moving part that has limit switches.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

Slider configuration		
Parameter	**Range**	**Description**
Slider opening far limit input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag for opening last far limit input.
Slider opening limit input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag for opening limit input.
Slider closing far limit input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag for closing last far limit input.
Slider closing limit input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag for closing limit input.
Slider opening maximum time	0 – 6500 x 0.1 Sec (1 x 0.1 Sec) Default: 0 x 0.1 Sec	Time till opening sensor should be reached.
Slider closing maximum time	0 – 6500 x 0.1 Sec (1 x 0.1 Sec) Default: 0 x 0.1 Sec	Time till closing sensor should be reached.

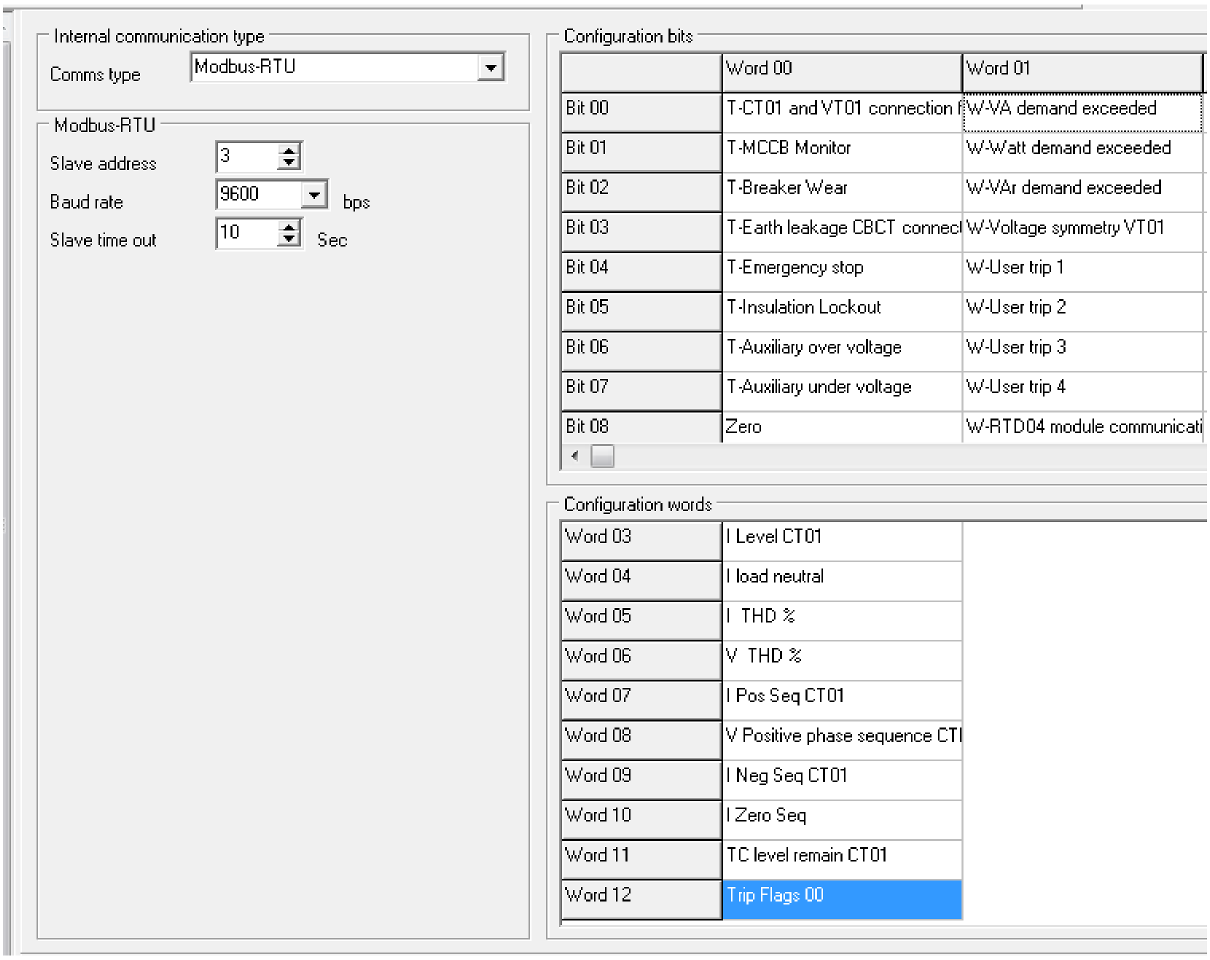
30 INTERNAL AND EXTERNAL COMMUNICATION MODULE

Description:

Every NewFeed comes with an internal communication module. An external communication module can be added to get onto a secondary SCADA bus.

Internal and external communication across all communication modules configuration can be broken up into 3 parts:

- Protocol configuration
  - Configuration needed to configure the communication module for SCADA.
- Assignable bit configuration
  - Assignable bit for user config word 00 – word 02.
  - These bits allow quick access to summary bits.
- Assignable word configuration.
  - Assignable bit for user config word 03 – word 12.
  - These words allow quick access to analogue values.



31 STATISTICS

Records of all the statistical data.

Not all statistic data have trip limits and just provide information under the tab “**Actual-> Statistic Data**”.

Actual statistic data was reset, and values shown is of reset values.

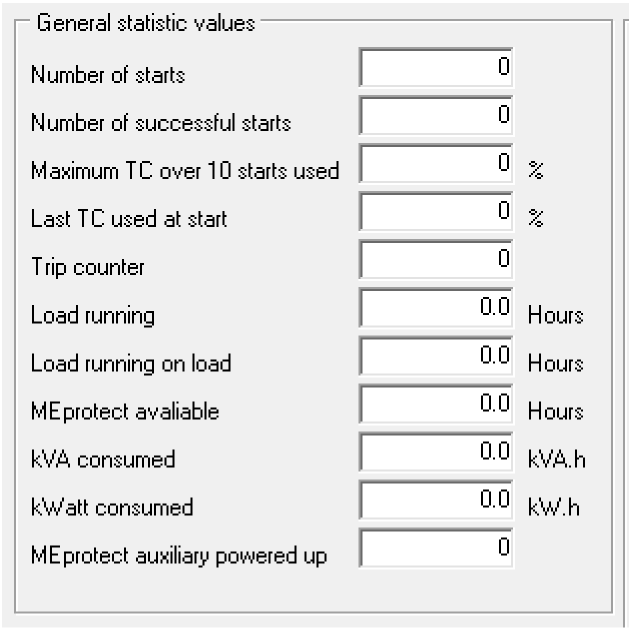
31.1 General statistics values

Description:

General information on how the switchgear is preforming over time.

Application:

All switch gear applications



Parameters:

General statistic values	
Parameter	**Description**
Number of starts	Amount of starts detected via “**In service**” > 100% or “**In service**” detected for 10 seconds continuously.
Number of successful starts	Were the load level going back below 100%.
Maximum TC over 10 start	Maximum thermal used over 10 starts.
Last TC used during start	Last thermal memory used to start drive.
Trip counter	Number of trips.
Load running	Accumulated hours running with **“Current present’** flag active.
Load running on load	Accumulated hours running with load level above the minimum load threshold.
NewFeed available	Accumulated hours while the switch gear had no load.
kVA consumed	Amount of reactive power consumed.
kWatt consumed	Amount of active power consumed.
NewFeed auxiliary powered up	Accumulate counts of how many times the auxiliary power to the NewFeed was cycled.

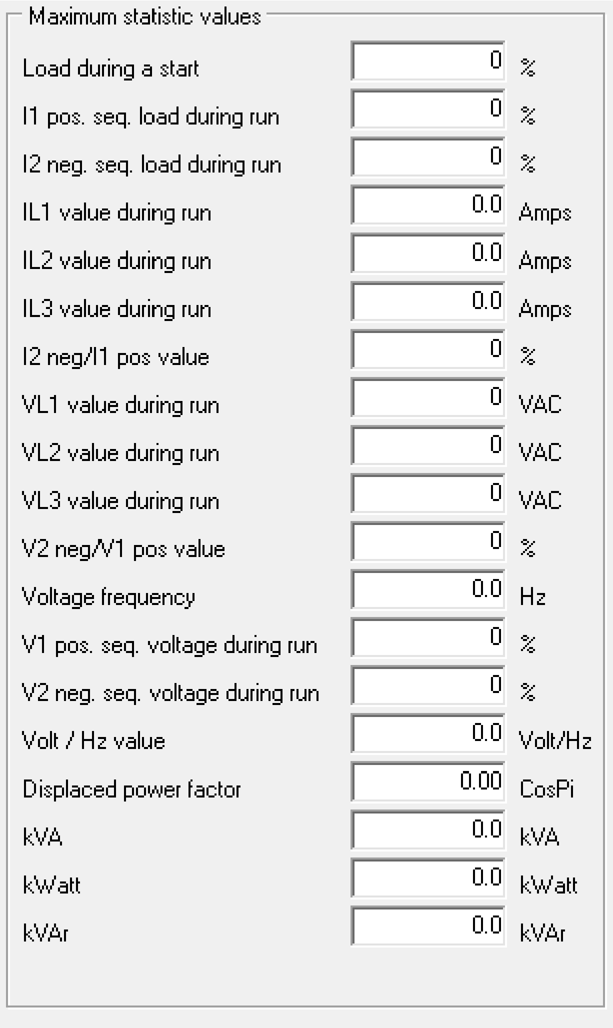
31.2 Maximum statistic values

Description:

Maximum running values of the switchgear.

Application:

All switch gear applications



Parameters:

Maximum statistic values	
Parameter	**Description**
Load during a start	Percentage level that went through CTMB during a start.
I1 positive sequence load during run	I1 positive sequence percentage load that was read during running of switch gear.
I2 negative sequence load during run	I2 negative sequence percentage load that was read during running of switch gear.
IL1 value during run	IL1 percentage level that was read during running condition.
IL2 value during run	IL2 percentage level that was read during running condition.
IL3 value during run	IL3 percentage level that was read during running condition.
I2 neg./I1 pos. sequence value	I2/I1 value in percentage during run condition.
VL1 value during run	VL1 VAC level that was read during running condition.
VL2 value during run	VL2 VAC level that was read during running condition.
VL3 value during run	VL3 VAC level that was read during running condition.
V2 neg./V1 pos. sequence value	V2/V1 value in percentage during run condition.
Voltage frequency	Frequency Hz level during running condition.
V1 positive sequence load during run	V1 positive sequence percentage load that was read during running of switch gear.
V2 negative sequence load during run	V2 negative sequence percentage load that was read during running of switch gear.
Volt/Hz value	Volt/Hz level to see the maximum fluxing of the core
Displace power factor	Displaced power factor CosØ level during run.
kVA	Maximum kVA level during run.
kWatt	Maximum kWatt level during run.
kVAr	Maximum kVAr level during run.

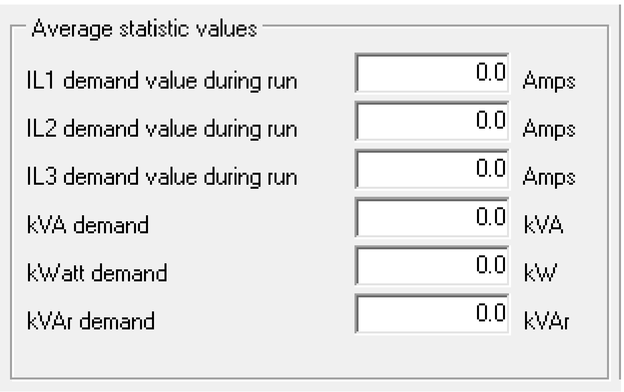
31.3 Average statistic values

Description:

Average running values of the switchgear.

Application:

All switch gear applications



Parameters:

Average statistic values	
Parameter	**Description**
IL1 demand value during run	IL1 average Amp load being drawn
IL2 demand value during run	IL2 average Amp load being drawn
IL3 demand value during run	IL3 average Amp load being drawn
kVA demand	kVA demand level being drawn
kWatt demand	kWatt demand level being drawn
kVAr demand	kVAr demand level being drawn.

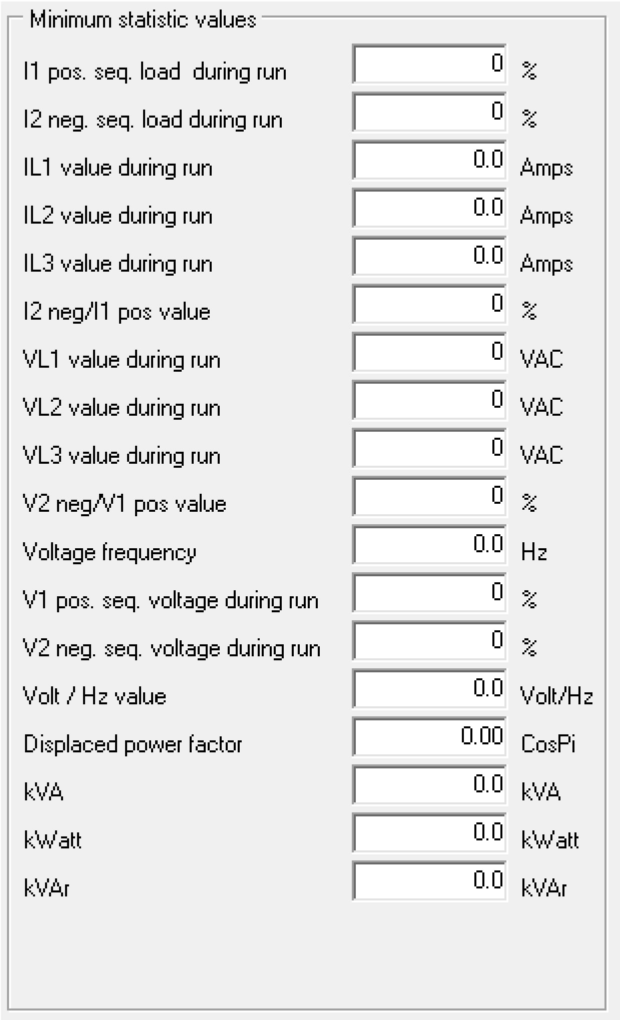
31.4 Minimum statistic values

Description:

Minimum running values of the switchgear.

Application:

All switch gear applications



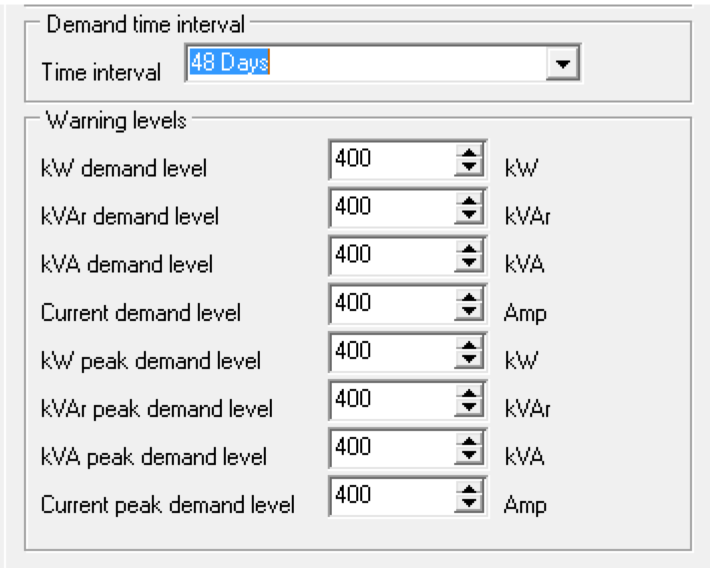
Parameters:

Minimum statistic values	
Parameter	**Description**
I1 positive sequence load during run	I1 positive sequence percentage load that was read during running of switch gear.
I2 negative sequence load during run	I2 negative sequence percentage load that was read during running of switch gear.
IL1 value during run	IL1 percentage level that was read during running condition.
IL2 value during run	IL2 percentage level that was read during running condition.
IL3 value during run	IL3 percentage level that was read during running condition.
I2 neg./I1 pos. sequence value	I2/I1 value in percentage during run condition.
VL1 value during run	VL1 VAC level that was read during running condition.
VL2 value during run	VL2 VAC level that was read during running condition.
VL3 value during run	VL3 VAC level that was read during running condition.
V2 neg./V1 pos. sequence value	V2/V1 value in percentage during run condition.
Voltage frequency	Frequency Hz level during running condition.
V1 positive sequence load during run	V1 positive sequence percentage load that was read during running of switch gear.
V2 negative sequence load during run	V2 negative sequence percentage load that was read during running of switch gear.
Volt/Hz value	Volt/Hz level to see the maximum fluxing of the core
Displace power factor	Displaced power factor CosPi level during run.
kVA	Maximum kVA level during run.
kWatt	Maximum kWatt level during run.
kVAr	Maximum kVAr level during run.

32 DEMAND CONTROL

Description:

Relay can keep track of demand and peak demand levels.



Demand level is the sum average over a time period set.

Following values are recorded for demand levels:

- IL1, IL2 and IL3.
- VL1, VL2 and VL3.
- kVA.
- kW.
- kVAr.

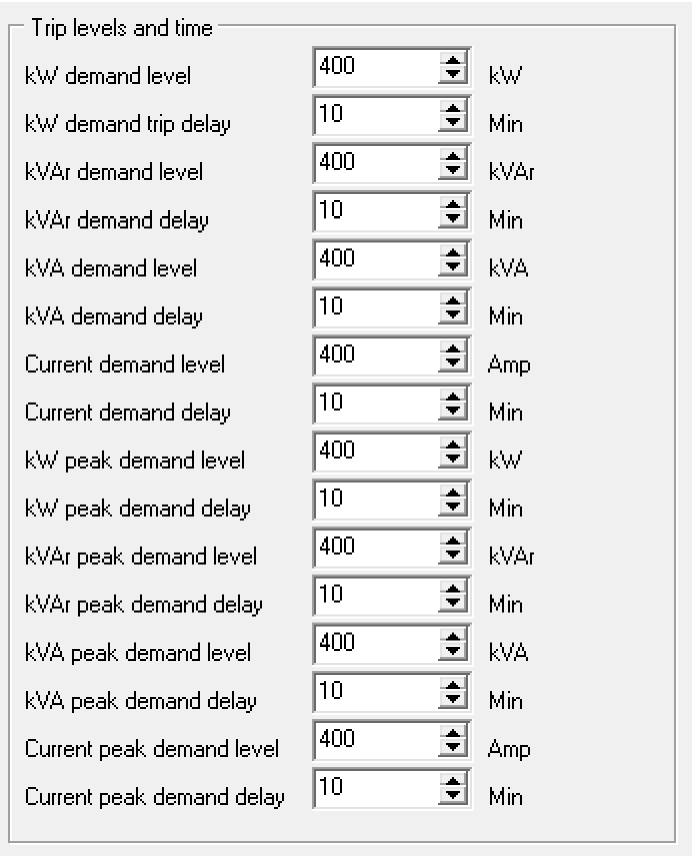
Warning and trip level can be set for each demand. Trip has an in depended timer running for each demand level.

Peak demand level is the maximum level value found at that point in time.

Following values are recorded for peak demand levels:

- IL1, IL2 and IL3.
- VL1, VL2 and VL3.
- kVA.
- kW.
- kVAr.

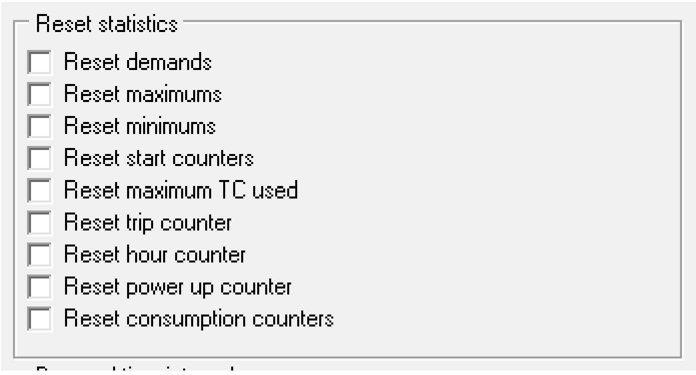
Warning and trip level can be set for each peak demand. Trip has an in depended timer running for each peak demand level.



Demand levels can be reset by setting the "**Reset demands**" and "**Reset maximums**" bit under the statistic setting map. This will clear the warning and trip flag.

The reset can be set via the NewFeed configuration software, communication module.

Each reset will be recorded in the event record.



Following minimum and maximum values are recorded. These values are kept till a reset command is given through:

- I1 positive sequence maximum and minimum.
- I2 negative sequence maximum and minimum.
- IL1, IL2 and IL3 peak and minimum value.
- I2 negative / I1 positive sequence maximum and minimum.
- V1 positive sequence maximum and minimum.
- V2 negative sequence maximum and minimum.
- VL1, VL2 and VL3 peak and minimum value.
- V2 negative / V1 positive sequence maximum and minimum.
- Line voltage frequency maximum and minimum.
- Displaced power factor maximum and minimum.
- kVA peak and minimum.
- kW peak and minimum.
- kVAr peak and minimum.

Parameters:

Demand control		
Parameter	**Range**	**Description**
Reset demands	• 0 = False • 1 = True Default: 0 = False	Reset all demand levels.
Reset maximums	• 0 = False • 1 = True Default: 0 = False	Reset all maximums and peak levels.
Reset minimums	• 0 = False • 1 = True Default: 0 = False	Reset all minimum levels.
Reset start counter	• 0 = False • 1 = True Default: 0 = False	Reset all start counters.
Reset maximum TC used	• 0 = False • 1 = True Default: 0 = False	Reset maximum TC used.
Reset trip counter	• 0 = False • 1 = True Default: 0 = False	Reset the trip counter.
Reset hour counter	• 0 = False • 1 = True Default: 0 = False	Reset all load hour counters.
Reset power up counter	• 0 = False • 1 = True Default: 0 = False	Reset the power up counter.
Reset consumptions	• 0 = False • 1 = True Default: 0 = False	Reset kVA and kW consumption counter.

Demand control		
Parameter	**Range**	**Description**
Demand interval	• 0 = 1 Sec • 1 = 4 Sec • 2 = 16 Sec • 3 = 64 Sec • 4 = 4 Min • 5 = 17 Min • 6 = 1 Hour • 7 = 4 Hours • 8 = 18 Hours • 9 = 3 Days • 10 = 12 Days • 11 = 48 Days Default: 0 = 1 Sec	Demand average sample recording time.
kW demand warning level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set warning flag.
kVAr demand warning level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set warning flag.
kVA demand warning level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set warning flag.
Current demand warning level	1 – 500000 A (1 A) Default: 400 A	Level needed to set warning flag.
kW peak demand warning level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set warning flag.
kVAr peak demand warning level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set warning flag.
kVA peak demand warning level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set warning flag.
Current peak demand warning level	1 – 500000 A (1 A) Default: 400 A	Level needed to set warning flag.
kW demand trip level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set alarm flag.
kVAr demand trip level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set alarm flag.

Demand control		
Parameter	**Range**	**Description**
kVA demand trip level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set alarm flag.
Current demand trip level	1 – 500000 A (1 A) Default: 400 A	Level needed to set alarm flag.
kW peak demand trip level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set alarm flag.
kVAr peak demand trip level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set alarm flag.
kVA peak demand trip level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set alarm flag.
Current peak demand trip level	1 – 500000 A (1 A) Default: 400 A	Level needed to set alarm flag.
kW demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVAr demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVA demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
Current demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kW peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVAr peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVA peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
Current peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.

Demand control		
Parameter	**Range**	**Description**
Current demand warning level	1 – 500000 A (1 A) Default: 400 A	Level needed to set warning flag.
kW peak demand warning level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set warning flag.
kVAr peak demand warning level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set warning flag.
kVA peak demand warning level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set warning flag.
Current peak demand warning level	1 – 500000 A (1 A) Default: 400 A	Level needed to set warning flag.
kW demand trip level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set alarm flag.
kVAr demand trip level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set alarm flag.
kVA demand trip level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set alarm flag.
Current demand trip level	1 – 500000 A (1 A) Default: 400 A	Level needed to set alarm flag.
kW peak demand trip level	1 – 400000000 kW (1 kW) Default: 400 kW	Level needed to set alarm flag.
kVAr peak demand trip level	1 – 400000000 kVAr (1 kVAr) Default: 400 kVAr	Level needed to set alarm flag.
kVA peak demand trip level	1 – 400000000 kVA (1 kVA) Default: 400 kVA	Level needed to set alarm flag.
Current peak demand trip level	1 – 500000 A (1 A) Default: 400 A	Level needed to set alarm flag.
kW demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.

Demand control		
Parameter	**Range**	**Description**
kVAr demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVA demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
Current demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kW peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVAr peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
kVA peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.
Current peak demand trip time	0 – 60 Min (1 Min) Default: 10 Min	Time needed to set the trip flag since the alarm flag was set.

33 RTD 04 AND RTD 08 MODULE CONFIGURATION

Description:

2 types of RTD modules can be connected. A 4 channel and 8 channel RTD.

RTD module connected must be selected and protection must also be enabled.

Both RTD modules configurations work the same.

The RTD thermostat sensor can be one of the following:

- PT100
- PT1000
- PTC
- NTC

These options allow a diversity in selecting different temperature sensors.

PT100 and PT1000 values are measured in degree Celsius.

PTC and NTC are resistor type sensors. The maximum resistor value is 3000 Ohms.

Each channel can also detect a shorted or open circuit connection on the temperature probe.

Connection type can also be selected for the temperature probe:

- Motor winding
- Motor winding and pre load
- Bearing
- Thermostat

Motor winding and pre load will take the temperature probes temperature and convert were the thermal capacity level should be.

This feature is only used on the PT100 and PT1000.

If the temperature thermal capacity used level is higher than the current calculated thermal capacity then the temperature calculation will be used.

The thermal capacity level is calculated from temperature as follow:

TC = ((Temp – 40 DegC * 100) / 80)

If (TC > 100) TC = 100.

This is used to try and correct the thermal capacity according to the actual temperature of the motor.

Each RTD has a high and low warning level and trip level.

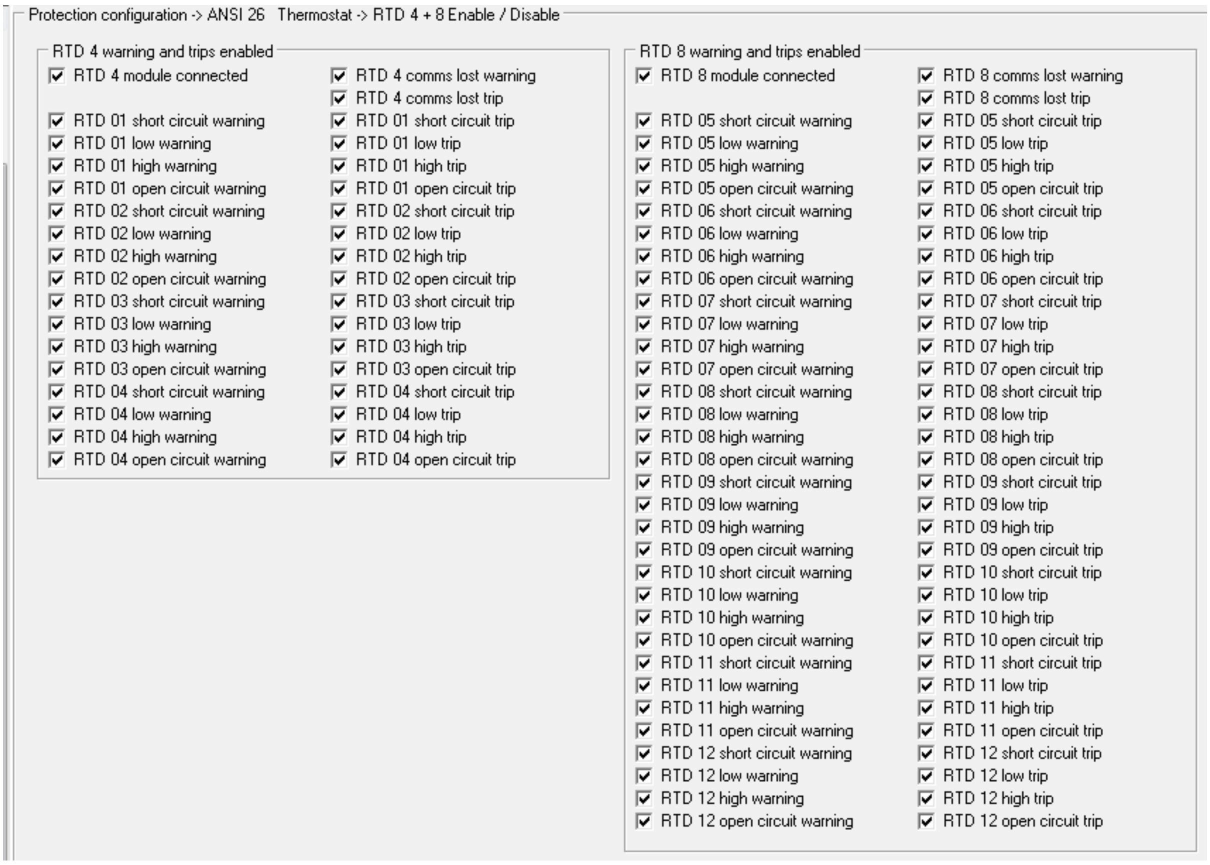
Warning levels will only set a warning flag once the temperature or resistor level is above the high or below the low warning levels.

Trip levels will only set an alarm flag once the temperature or resistor level is above the high or below the low warning levels. After the trip time has expired then the trip flag will be set.

Module RTD 08 follows the same configuration except the configuration is from channel 5 to 12.

Application:

Any device that require that temperature does not exceed or fall below a certain temperature.



Protection configuration -> ANSI 26 Thermostat -> RTD 4 Type and level

RTD 1 channel -

Type	PT100	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 3 channel -

Type	PTC	
Connection	Thermostat	
High trip level	1000	Ohm
High warning level	850	Ohm
Low warning level	0	Ohm
Low trip level	0	Ohm
Trip delay	10	Sec

RTD 2 channel -

Type	PT1000	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 4 channel -

Type	NTC	
Connection	Thermostat	
High trip level	2500	Ohm
High warning level	2500	Ohm
Low warning level	100	Ohm
Low trip level	80	Ohm
Trip delay	10	Sec

Protection configuration -> ANSI 26 Thermostat -> RTD 8 Type and level

RTD 5 channel -

Type	PT100	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 8 channel -

Type	PT1000	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 11 channel -

Type	NTC	
Connection	Thermostat	
High trip level	2500	Ohm
High warning level	2500	Ohm
Low warning level	100	Ohm
Low trip level	60	Ohm
Trip delay	10	Sec

RTD 6 channel -

Type	PT100	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 9 channel -

Type	PTC	
Connection	Thermostat	
High trip level	1000	Ohm
High warning level	850	Ohm
Low warning level	0	Ohm
Low trip level	0	Ohm
Trip delay	10	Sec

RTD 12 channel -

Type	NTC	
Connection	Thermostat	
High trip level	2500	Ohm
High warning level	2500	Ohm
Low warning level	100	Ohm
Low trip level	60	Ohm
Trip delay	10	Sec

RTD 7 channel -

Type	PT1000	
Connection	Thermostat	
High trip level	150	DegC
High warning level	110	DegC
Low warning level	40	DegC
Low trip level	20	DegC
Trip delay	10	Sec

RTD 10 channel -

Type	PTC	
Connection	Thermostat	
High trip level	1000	Ohm
High warning level	850	Ohm
Low warning level	0	Ohm
Low trip level	0	Ohm
Trip delay	10	Sec

Parameters - RTD 04 + 08 Enabled or disabled:

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 04 connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	RTD 04 module is part of the system.
RTD 04 communication lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If communication with RTD 04 is disrupted for more than 2 seconds, then set warning flag.
RTD 04 communication lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If communication with RTD 04 is disrupted then set alarm flag after 2 seconds, then set trip flag.
RTD 1 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 1 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 1 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 1 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 1 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 1 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 1 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 1 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 2 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 2 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 2 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 2 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 2 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 2 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 2 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 2 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 3 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 3 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 3 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 3 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 3 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 3 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 3 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 3 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 4 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 4 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 4 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 4 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 4 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 4 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 4 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 4 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 08 connected	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	RTD 08 module is part of the system.
RTD 08 communication lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If communication with RTD 08 is disrupted for more than 2 seconds, then set warning flag.
RTD 08 communication lost warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	If communication with RTD 08 is disrupted then set alarm flag after 2 seconds, then set trip flag.
RTD 5 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 5 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 5 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 5 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 5 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 5 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 5 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 5 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 6 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 6 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 6 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 6 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 6 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 6 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 6 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 6 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 7 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 7 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 7 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 7 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 7 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 7 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 7 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 7 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 8 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 8 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 8 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 8 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 8 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 8 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 8 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 8 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 9 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 9 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 9 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 9 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 9 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 9 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 9 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 9 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 10 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 10 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 10 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 10 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 10 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 10 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 10 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 10 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 11 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 11 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 11 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 11 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.
RTD 11 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 11 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 11 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 11 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.
RTD 12 short circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when a short circuit is detected.
RTD 12 low warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes below low warning level.
RTD 12 high warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when level goes above high warning level.
RTD 12 open circuit warning	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Warning flag to be active when an open circuit is detected.

RTD 04 + 08 enabled or disabled		
Parameter	**Range**	**Description**
RTD 12 short circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when a short circuit is detected.
RTD 12 low trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes below low trip level and trip time has expired.
RTD 12 high trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when level goes above high trip level and trip time has expired.
RTD 12 open circuit trip	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Trip flag to be active when an open circuit is detected.

Parameters - RTD 04 type and levels:

RTD 04 type and levels		
Parameter	**Range**	**Description**
RTD 1 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 2 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 3 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 4 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.

RTD 04 type and levels		
Parameter	**Range**	**Description**
RTD 1 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 2 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 3 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 4 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 1 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 1 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 1 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.

RTD 04 type and levels		
Parameter	**Range**	**Description**
RTD 1 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 2 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 2 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 2 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 2 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 3 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.

RTD 04 type and levels		
Parameter	**Range**	**Description**
RTD 3 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 3 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 3 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 4 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 4 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 4 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.

RTD 04 type and levels		
Parameter	**Range**	**Description**
RTD 4 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 1 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 2 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 3 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 4 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.

Parameters - RTD 08 type and levels:

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 5 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 6 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 7 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 8 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 9 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 10 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 11 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 12 type	• 0 = PT100 • 1 = PT1000 • 2 = PTC • 3 = NTC Default: 0 = PT100.	Type of temperature sensor connected.
RTD 5 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 6 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 7 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 8 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 9 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 10 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 11 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 12 type connection	• 0 = Motor winding • 1 = Motor winding and pre load • 2 = Bearing • 3 = Thermostat Default: 0 = Motor winding.	Were the RTD sensor is connected.
RTD 5 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 5 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 5 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 5 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 6 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 6 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 6 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 6 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 7 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 7 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 7 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 7 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 8 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 8 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 8 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 8 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 9 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 9 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 9 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 9 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 10 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 10 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 10 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 10 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 11 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 11 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 11 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 11 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 12 high warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the warning flag.
RTD 12 high trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be above to set the alarm flag.
RTD 12 low trip level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 90 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the alarm flag.
RTD 12 low warning level	PT100 or PT1000: -30 – 220 DegC (1 DegC) Default: 70 DegC PTC or NTC: 0 – 2500 Ohm (10 Ohm)	Temperature or resistor level sensor must be below to set the warning flag.
RTD 5 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 6 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 7 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 8 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 9 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 10 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.

RTD 08 type and levels		
Parameter	**Range**	**Description**
RTD 11 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.
RTD 12 trip delay	1 – 250 Sec (1 Sec) Default: 10 Sec	Time from that alarm flag was set till trip flag will be set.

34 4 TO 20 MA ANALOGUE MODULE

Description:

Analog module has 2 channels out and 2 channels out.

The modules can be configured self power or supplied power from the 4 to 20 mA circuit.

Analog input channel has a high warning and trip level and low warning and trip level with trip delays.

Analog output channel has a high warning and trip level and low warning and trip level with trip delays.

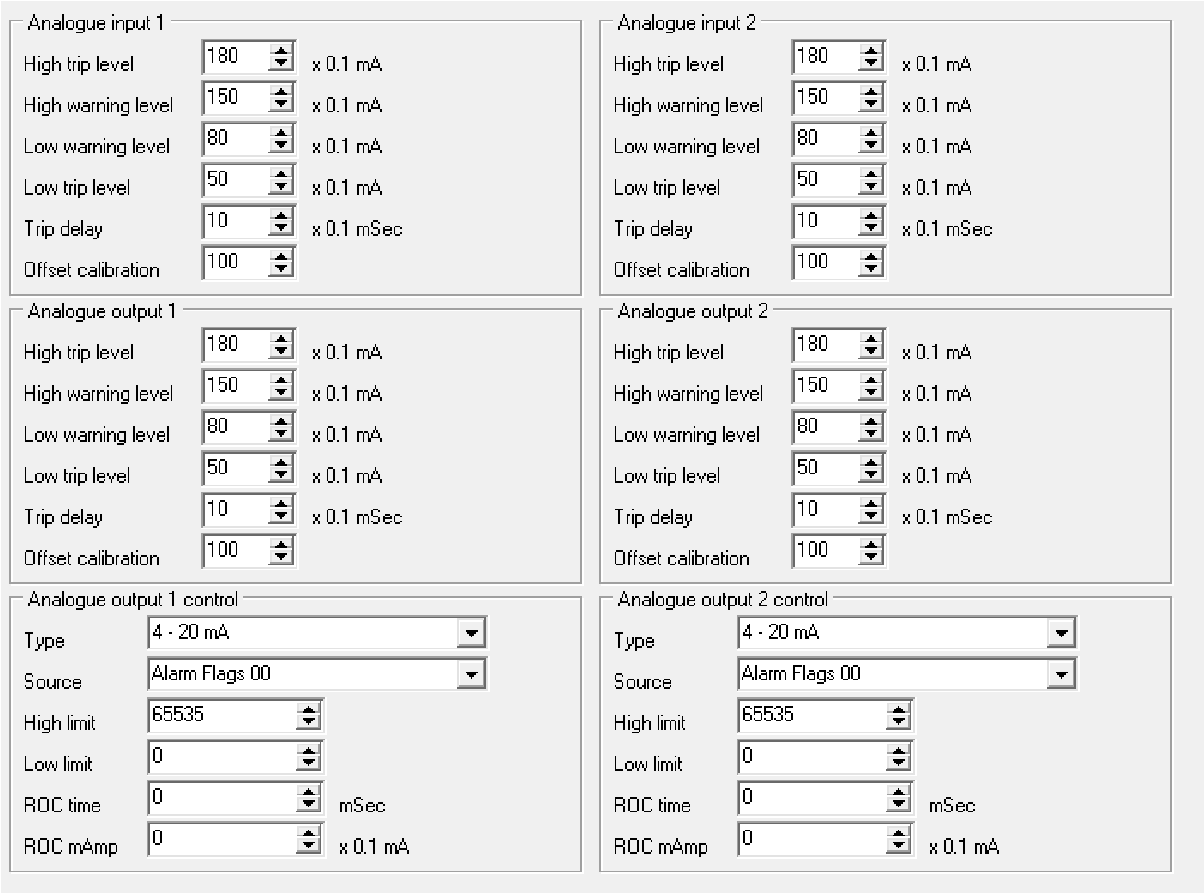
Analog output can also be configured as a:

- 4 to 20 mA
- 0 to 20 mA
- Bypass

Analog output level can be set to have a rate of change to slow down the output of the 4 to 20 mA out. The source signal can also be selected to control the 4 to 20 mA output signal.

Application:

Requires a 4 to 20 mA signal to be read or generated.



Parameters:

4 to 20 mA analogue module		
Parameter	**Range**	**Description**
Ana input 1 high trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is above.
Ana input 1 high warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is above.
Ana input 1 low trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is below.
Ana input 1 low warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is below.

4 to 20 mA analogue module		
Parameter	**Range**	**Description**
Ana input 1 trip delay	0 – 6553 x 0.1Sec (1 x 0.1Sec) Default: 10.0 Sec	Time delay since the alarm flag was set till the trip flag will be set.
Ana input 2 high trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is above.
Ana input 2 high warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is above.
Ana input 2 low trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is below.
Ana input 2 low warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is below.
Ana input 2 trip delay	0 – 6553 x 0.1Sec (1 x 0.1Sec) Default: 10.0 Sec	Time delay since the alarm flag was set till the trip flag will be set.
Ana output 1 high trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is above.
Ana output 1 high warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is above.
Ana output 1 low trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is below.
Ana output 1 low warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is below.
Ana output 1 trip delay	0 – 6553 x 0.1Sec (1 x 0.1Sec) Default: 10.0 Sec	Time delay since the alarm flag was set till the trip flag will be set.
Ana output 2 high trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is above.
Ana output 2 high warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is above.
Ana output 2 low trip level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the alarm flag will be set when the analogue level is below.
Ana output 2 low warning level	0 – 250 x 0.1mA (1 x 0.1mA) Default: 18.0 mA	Level that the warning flag will be set when the analogue level is below.

4 to 20 mA analogue module		
Parameter	**Range**	**Description**
Ana output 2 trip delay	0 – 6553 x 0.1Sec (1 x 0.1Sec) Default: 10.0 Sec	Time delay since the alarm flag was set till the trip flag will be set.
Ana output 1 type	• 0 = 4 – 20 mA • 1 = 0 – 20 mA • 2 = Bypass Default: 0 = 4 – 20mA	Analog output type selection.
Ana output 1 source	4 to 20mA lookup table for selected input. Default: Zero.	See 4 to 20mA lookup table for parameter input. Input word for analogue channel output.
Ana output 1 high limit	0 – 65535 (1) Default: 65535	Maximum word that will be the 20mA level.
Ana output 1 low limit	0 – 65535 (1) Default: 0	Minimum word that will be the 4mA or 0 mA level.
Ana output 1 ROC timer	0 – 10000 milli Sec(1 milli Sec) Default: 0	Rate in time that the analogue output must change at.
Ana output 1 ROC mAmp	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Rate in mAmp at the time interval that the analogue output must change at.
Ana output 1 type	• 0 = 4 – 20 mA • 1 = 0 – 20 mA • 2 = Bypass Default: 0 = 4 – 20mA	Analog output type selection.
Ana output 1 source	4 to 20mA lookup table for selected input. Default: Zero.	See 4 to 20mA lookup table for parameter input. Input word for analogue channel output.
Ana output 1 high limit	0 – 65535 (1) Default: 65535	Maximum word that will be the 20mA level.
Ana output 1 low limit	0 – 65535 (1) Default: 0	Minimum word that will be the 4mA or 0 mA level.
Ana output 1 ROC timer	0 – 10000 milli Sec(1 milli Sec) Default: 0	Rate in time that the analogue output must change at.
Ana output 1 ROC mAmp	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Rate in mAmp at the time interval that the analogue output must change at.
Ana input 1 offset correction	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Correct the mAmp level of the analogue channel.
Ana input 2 offset correction	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Correct the mAmp level of the analogue channel.
Ana output 1 offset correction	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Correct the mAmp level of the analogue channel.
Ana output 2 offset correction	0 – 250 x 0.1 mA (1 x 0.1 mAmp) Default: 0 mAmp	Correct the mAmp level of the analogue channel.

35 EXTERNAL IO MODULE

Description:

External IO module allows to add an extra 8 x differential in depended field inputs and 4 x change over N/O and N/C relay outputs.

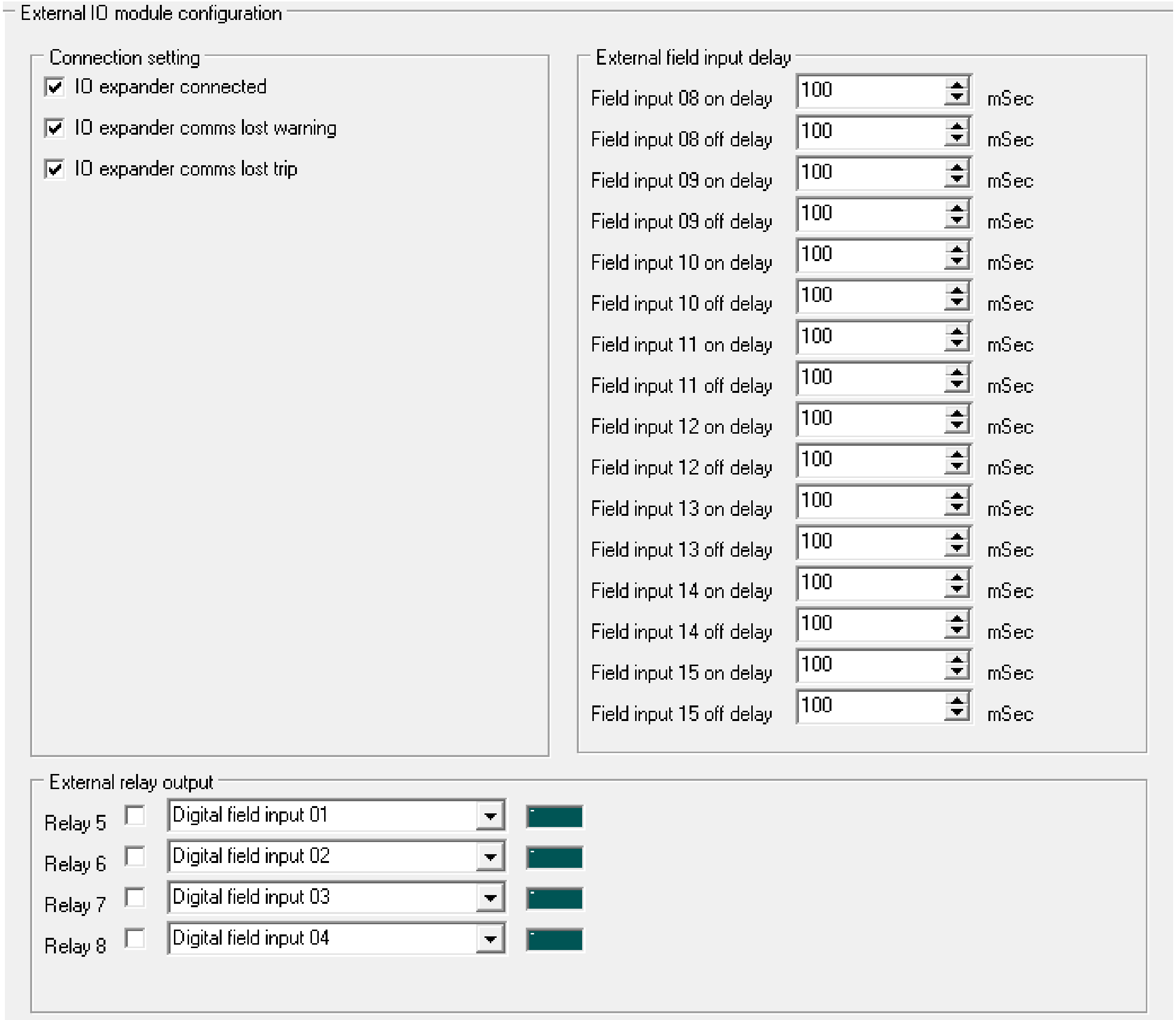
The field inputs have their own on and off delays to get around bouncing or unstable signals.

The 4 output relay signals are fully configurable and makes use of the NewFeed logic flags.

The external IO module connects to the NewFeed relay via the TBUS.

Application:

Were more inputs or different field inputs with different voltage configuration is needed in the switch gear.



NOTE ON FLAG INPUT SELECTION BOX	
	Checkbox in front of input signal means that signal will be inverted (True = false and False = true). 

Parameters:

EXTERNAL IO MODULE		
Parameter	**Range**	**Description**
Field input 08 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 08 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 09 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 09 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 10 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 10 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 11 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 11 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 12 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 12 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 13 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 13 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 14 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 14 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Field input 15 on delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be on to set the field input flag.
Field input 15 off delay	0 – 65500 milli Sec(10 milli Sec) Default: 100 milli Sec	Period that the input must be off to clear the field input flag.
Relay 5 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 5 configuration.
Relay 6 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 6 configuration.
Relay 7 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 7 configuration.
Relay 8 input	Logic lookup table for selected input. Default: Zero.	See logic lookup table for parameter input. Input flag used for relay 8 configuration.

36 PROTECTION CLOCK

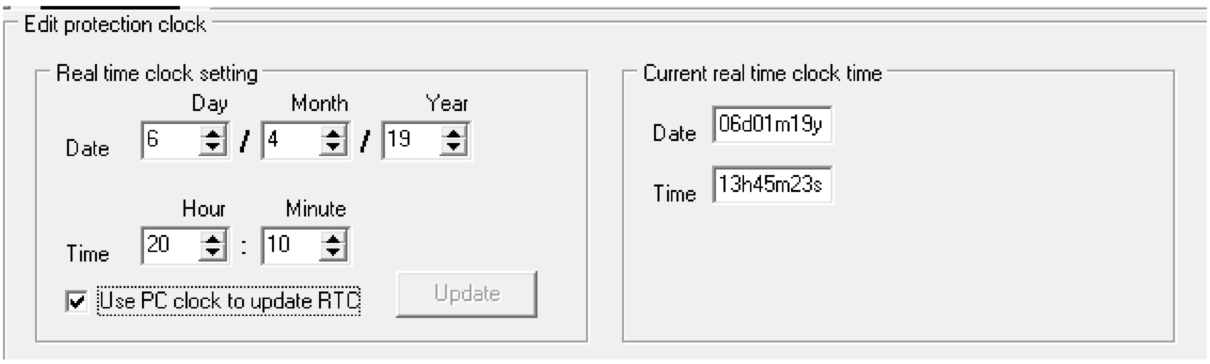
Description:

Edits the 24 hour real time clock (RTC) located in the NewFeed.

The RTC is an internal clock that is used to reference date and time stamping to all faults and events.

Application:

Used in all applications.



Parameters:

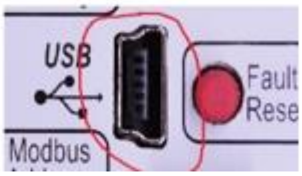
PROTECTION CLOCK		
Parameter	**Range**	**Description**
Day	1 – 31 (1) Default: 1	Day
Month	1 – 12 (1) Default: 1	Month
Year	0 – 99 (1) Default: 0	Year
Hour	0 – 23 (1) Default: 0	Hour
Minute	0 – 59 (1) Default: 0	Minute
Use PC Clock to update RTC	• 0 = Disabled • 1 = Enabled Default: 0 = Disabled	Uses the PC time to program the NewFeed relay time and date stamp.

37 NewFeed OPERATION

37.1 Installing USB drivers

Before connecting to the NewFeed a USB Type-A to Mini-B cable will be needed.

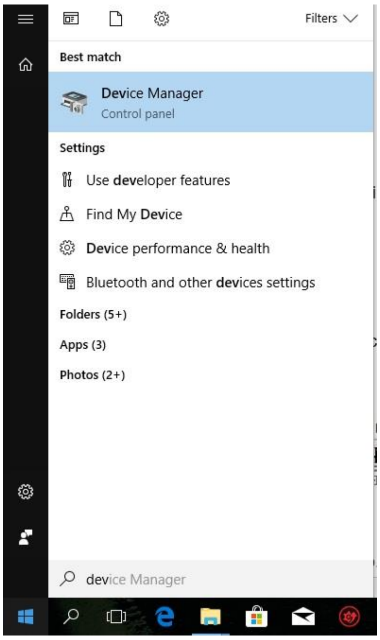
Plug the USB Type-A into a PC USB port and the Mini-B into the USB port located in the front of the NewFeed.



The illustration was done using Windows 10™ operating system.

If Windows™ does not ask to install new device.

Then search for "**Device Manager**" on windows task bar.



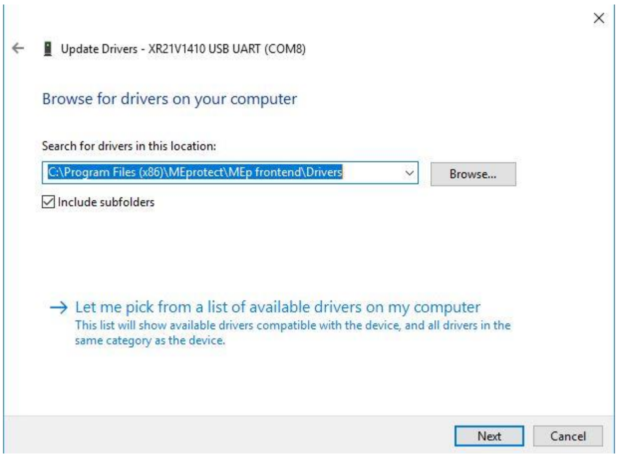
Next find the USB port device under “**Ports (COM & LPT)**”.

Right click on the “**USB Serial Device (COM8)**” or “**Unknown Device**”.

Select “**Update Drivers**”.

Browse to the directory that the frontend is installed in and select directory “**NewFeed frontend\Drivers**”.

Make sure that “**Include subfolders**” is checked.



Click the “**Next**” button and complete installation.

The port will look as follow under the “**Device manager**” when successfully installed.

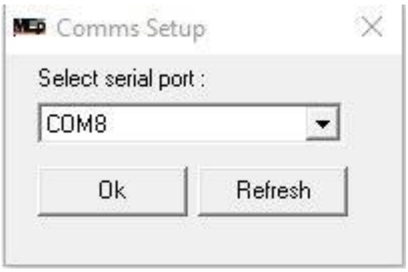
37.2 Connecting and disconnecting NewFeed configuration software to NewFeed relay

Connecting to the NewFeed configuration software needs to be done in the following manner:

Click on the “**Comms Setup**” in the task bar.

Comms Setup box will open up.

Select the correct communication port and click the “**Ok**” button.



Press the “**Connect**” button in the task bar.

If successfully connected the task bar state should look as shown below.

The progress bar in the status bar should also be running from left to right at top.

To disconnect press the “**Disconnect**” button.

37.3 Reading settings from NewFeed relay

Reading settings from the NewFeed to can be done by pressing the “**Read settings from NewFeed**” all button.

All of the settings will be read from the NewFeed.

37.4 Writing settings to NewFeed relay

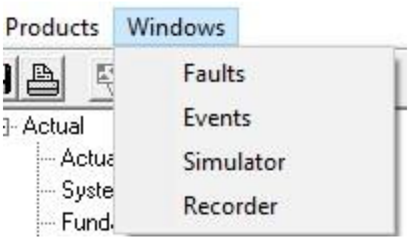
Press the “**Write settings to NewFeed**” button to write settings to the NewFeed from the NewFeed configuration software. A progress bar will indicate when uploading / writing is complete.

37.5 Opening settings file

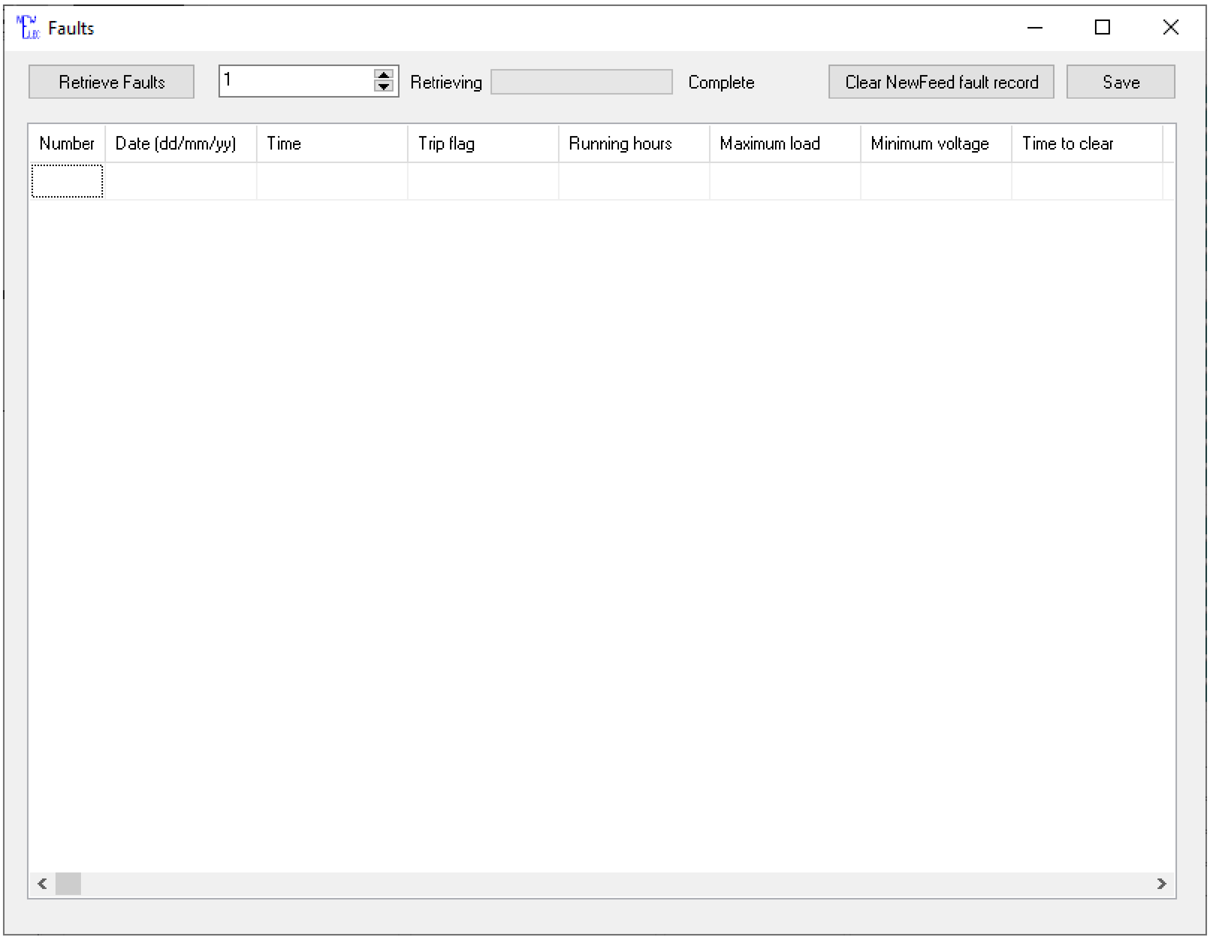
Settings filed saved can be open via the NewFeed configuration software.

37.6 Reading fault records

Fault record of the NewFeed can be access by clicking on “**View->Faults**” on the menu bar.



Following window will popup.



Next to the download fault button the number of faults to be downloaded from the NewFeed can be specified from 1 to 36 faults.

Press the “**Retrieve Faults**” button to start reading the faults from the NewFeed.

All faults are time and date stamped.

List of all trip flags active when the fault occurred as well.

Running hours shows how long the system was active for.

Maximum load is the peak current level in % during the trip.

Minimum voltage is the minimum phase voltage level in VAC during the trip.

Breaker clear timer is the time it took for the load current to clear after a trip command was executed in milli Sec.

Recurring counter is the number of times the fault occurred after each other.

Faults can be saved after downloading the faults and then clicking on the “**Save**” button.

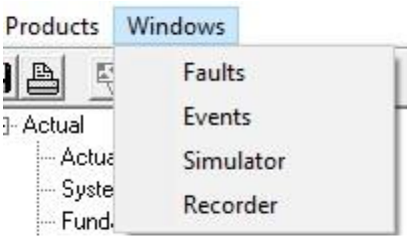
The fault file can be opened with a spreadsheet program.

Fault records can be cleared by pressing the “**Clear faults**” button

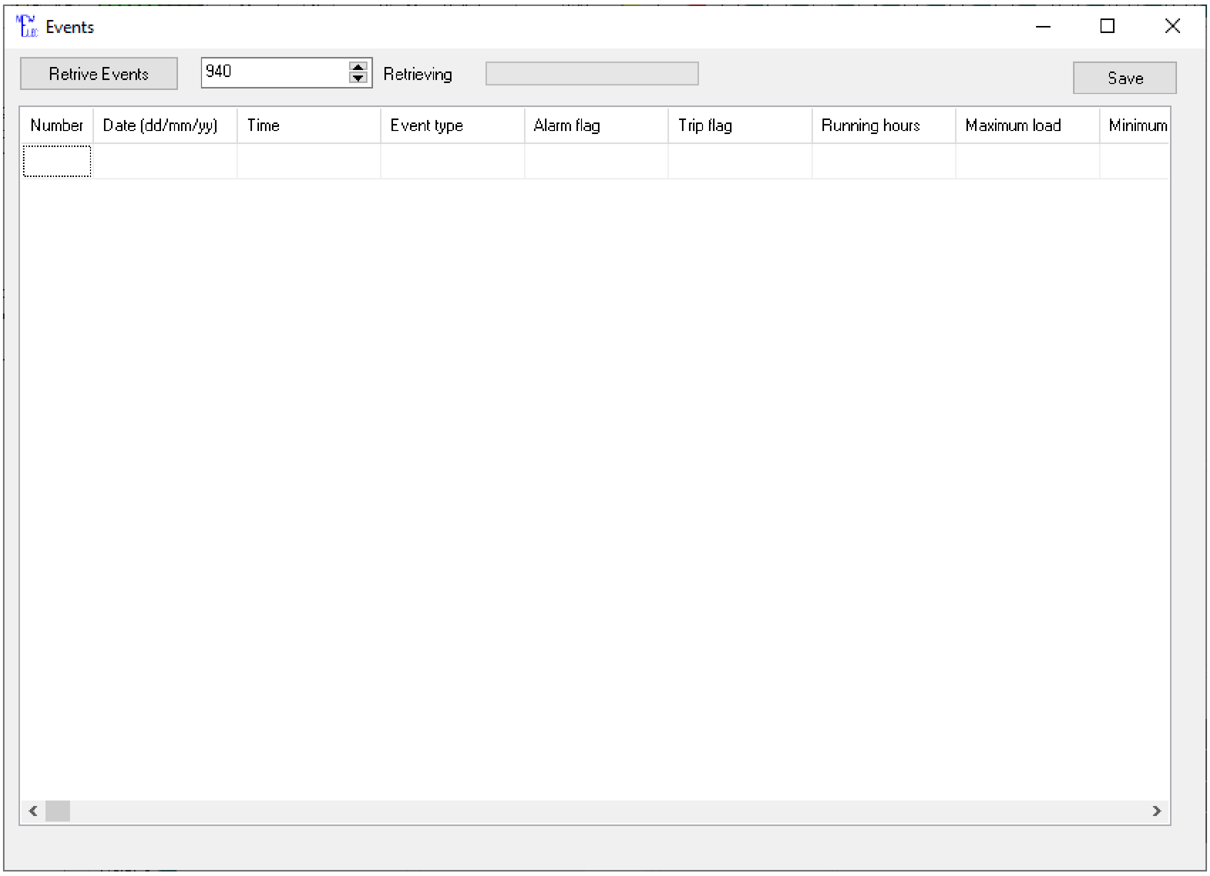
37.7 Reading event records

Event record of the NewFeed can be access by clicking on “**View->Events**” on the menu bar.

Events is a more detailed capture of what happened with the NewFeed.



Following window will popup.



Next to the download event button the number of events to be downloaded from the NewFeed can be specified from 1 to 940 events.

Press the “**Retrieve Events**” button to start reading the events from the NewFeed.

After reading is complete the events will show on the screen.

All events are time and date stamped.

Event type will specify the event type and include if the NewFeed was in simulation mode.

List of all alarm flags active when the event occurred as well.

List of all trip flags active when the event occurred as well.

Running hours shows how long the system was active for.

Maximum load is the peak current level in % during the trip.

Minimum voltage is the minimum phase voltage level in VAC during the trip.

Breaker clear timer is the time it took for the load current to clear after a trip command was executed in milli Sec.

Recurring counter is the number of times the event type occurred after each other.

Events can be saved after downloading the events and then clicking on the “**Save**” button.

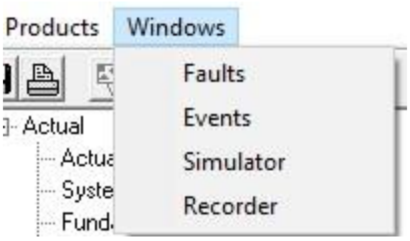
The event file can be opened with a spreadsheet program.

37.8 NewFeed configuration software recorder

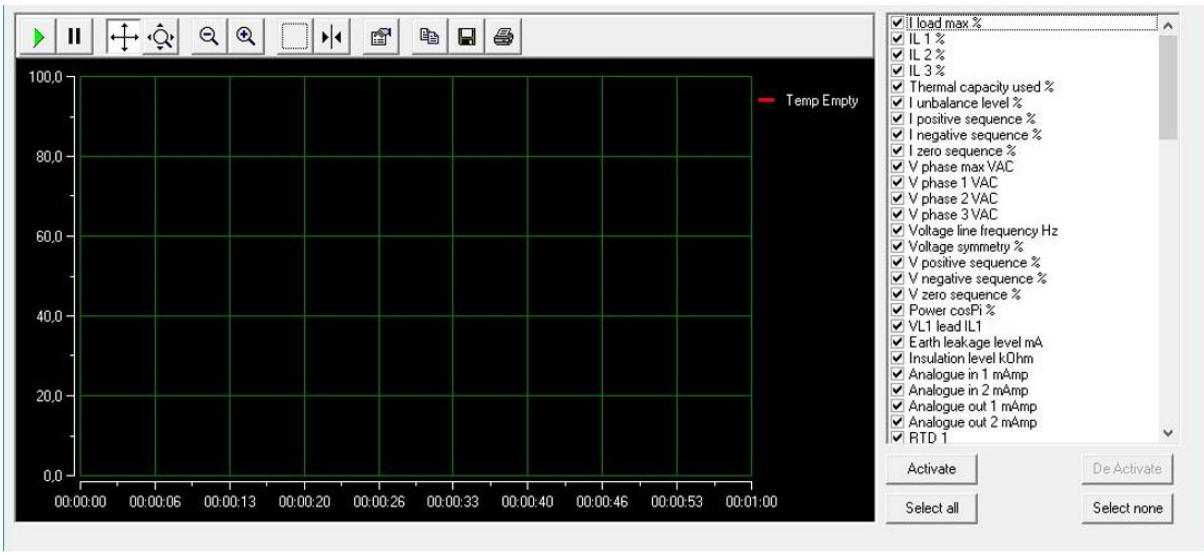
Recorder gives the ability to record the actual values to a file.

This file can then be open at a later stage in a spreadsheet program for analysing.

Recorder can be accessed access by clicking on “**View->Recorder**”



The recorder will open then open up.

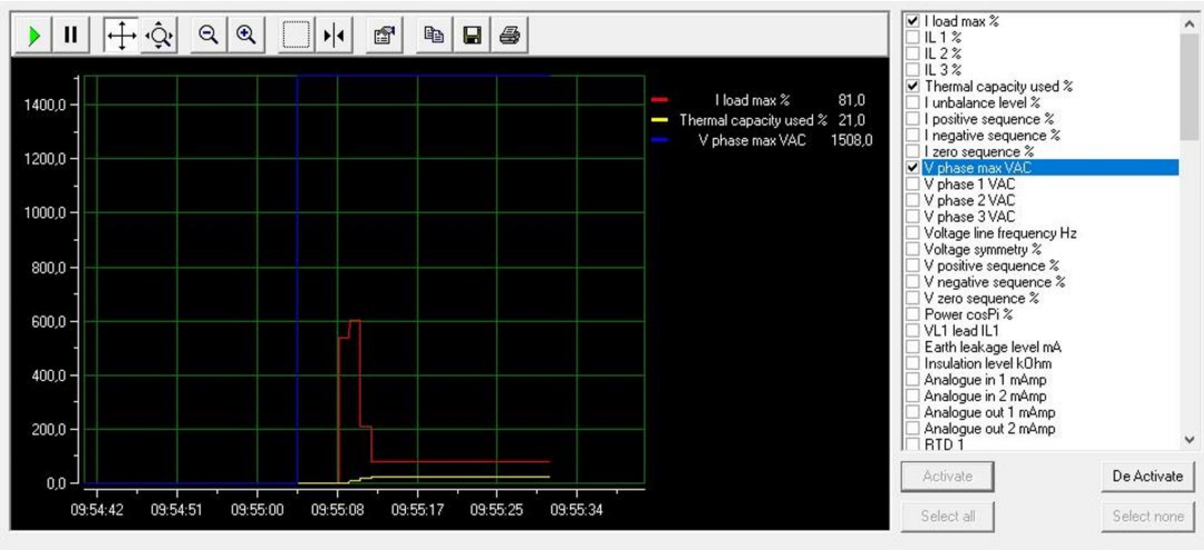


First the channels that are needed for monitoring need to be selected by clicking on the check sign on the left of the channel selection.

Button “**Select none**” will de select all the checks.

Button “**Select all**” will select all the checks.

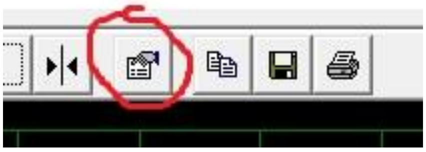
After all the correct channels have been selected press the "**Activate**" button.



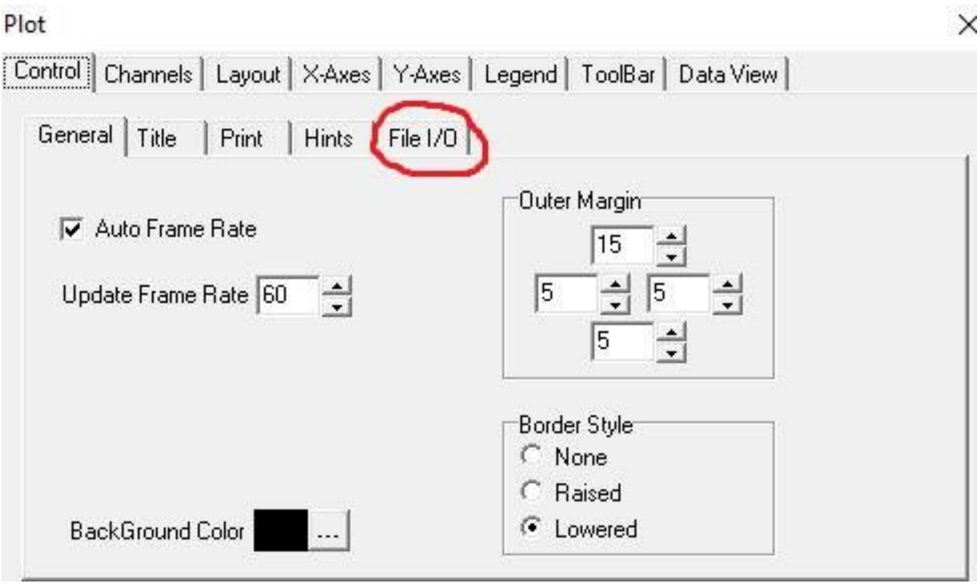
The recorder will start running but not record to a file.

To start the file recorder the following steps must be taken.

Click on the "**Property**" button of the recorder.

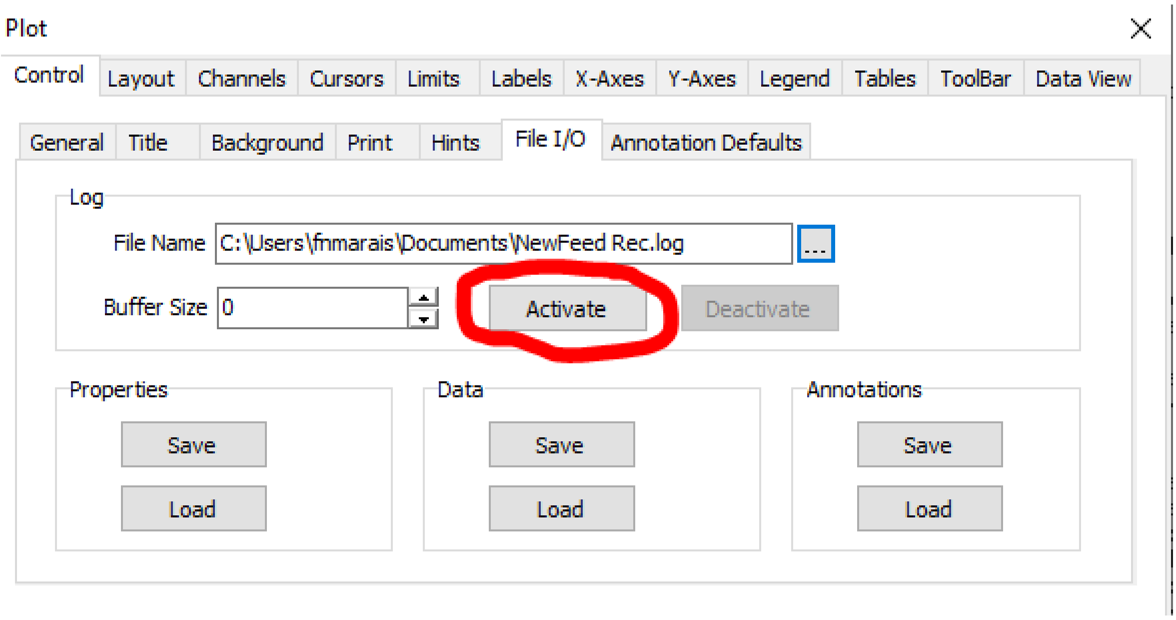


Click on the "**File I/O**" tab

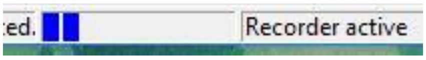


Click on the "**…**" button to open the file path and file name to save. Press the "**Open**" button after typing in the file name.

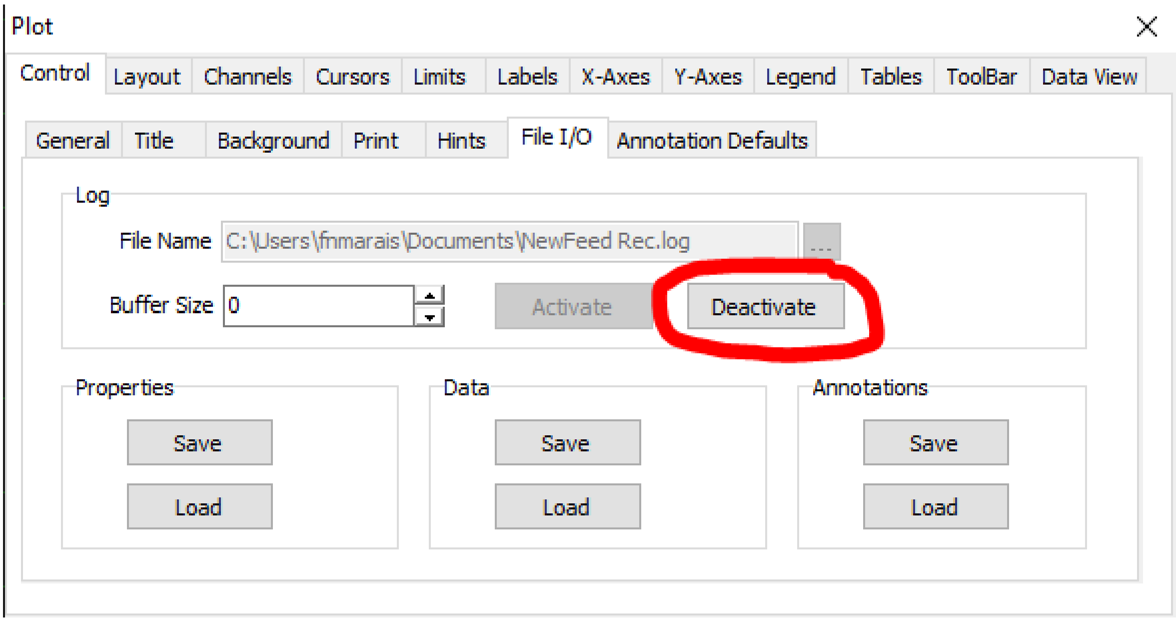
After the file name is selected press the "**Activate**" button.



The recorder will start recording. On the main window next to the communication progress bar in the status bar a confirmation of recording will say "**Recorder Active**".



Stopping recorder will follow the same path except the "**Deactivate**" button must be pressed.



The recorder will then be deactivated, and the file can then be viewed in a spreadsheet program.

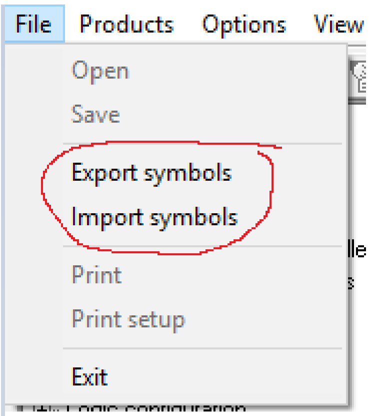
37.9 Descriptions on NewFeed configuration software

A symbol table can be used to give functional descriptions to various parts for the NewFeed configuration software.

- Field inputs
- Relay outputs
- Logic functions
- RTD
- 4 to 30 mA
- Internal communication module
- External communication module
- Tele meter

The symbol table can be accessed via "**View->Symbol table**".

The symbol table can be also exported and imported via the "**File->Export symbol**" and "**File->Import symbol**"



The symbol table will also be saved with the setting file.

The symbol table will also allow between switching of the NewFeed relay descriptions or the Symbol table.

38 DESCRIPTIONS

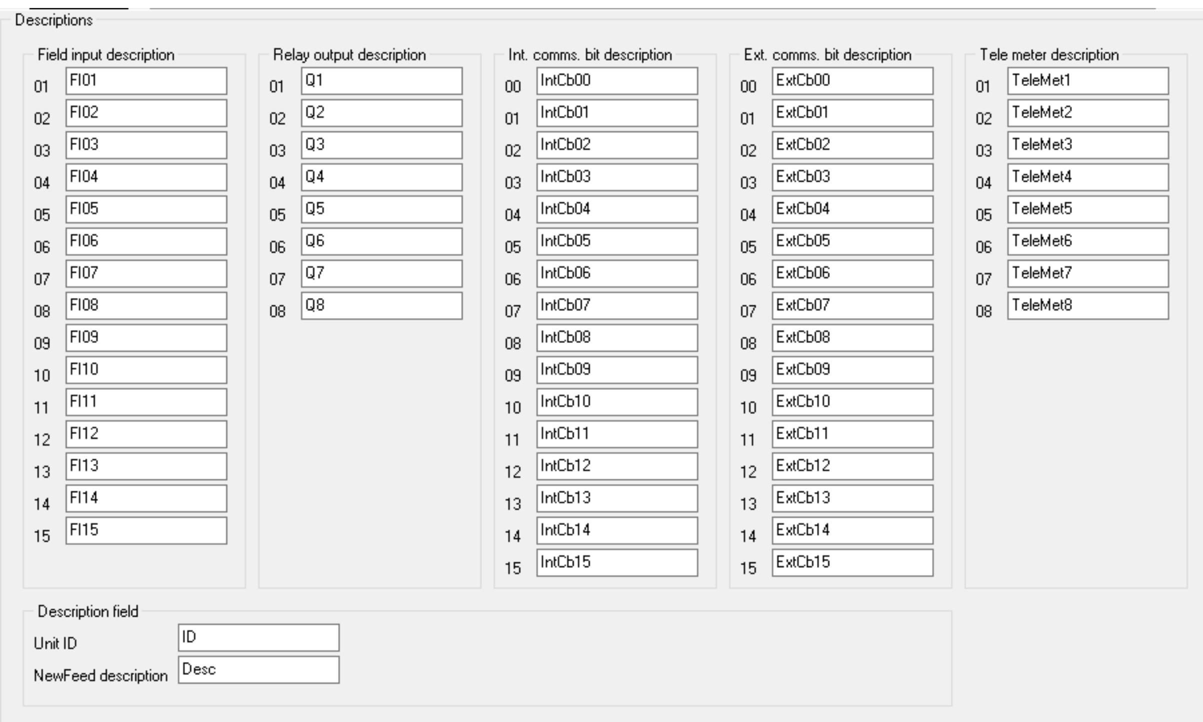
Description:

Descriptions field that describe the NewFeed relay. These descriptions are to aid system integrates to add labels that can be assigned from the NewFeed relay to the SCADA.

Application:

Any SCADA application that require description field via the SCADA from the NewFeed relay.

!!!! WARNING !!!!	
	It is recommended to read the description once and not every main cycle of the PLC as this can make cycle times extremely long.



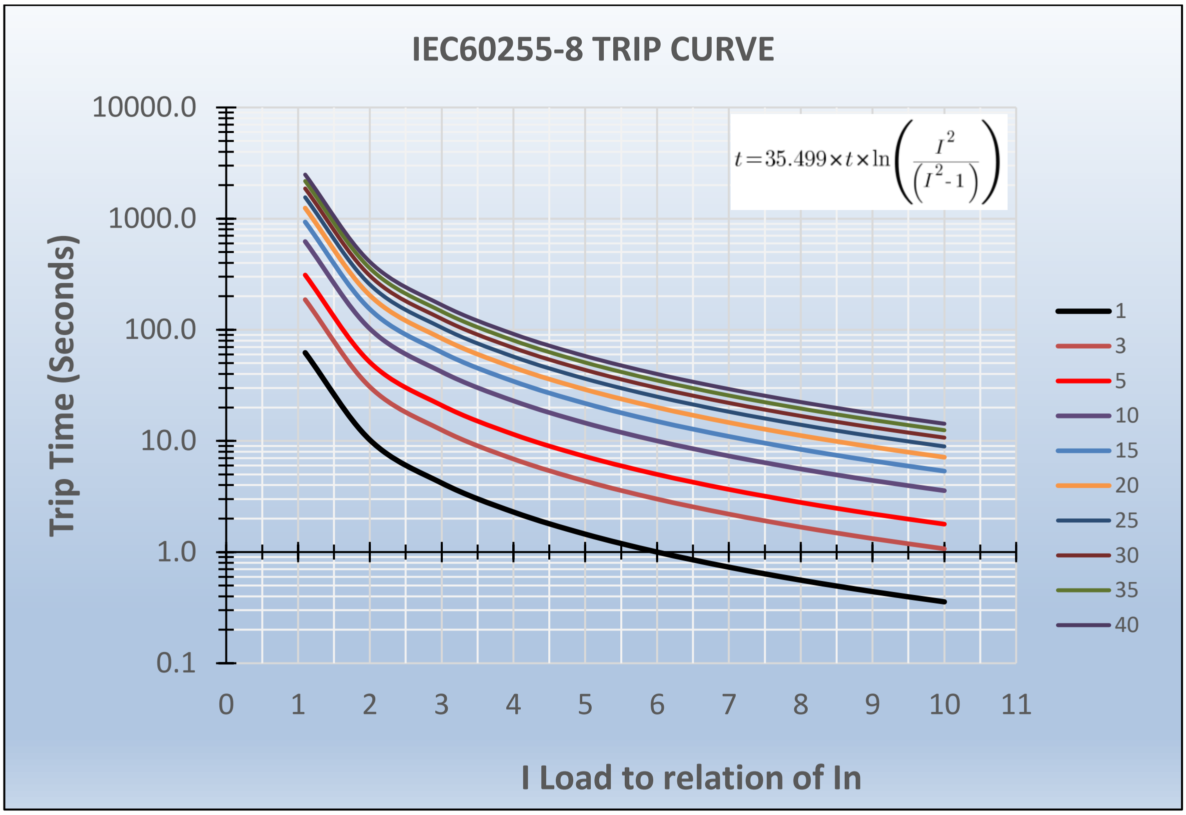
Parameters:

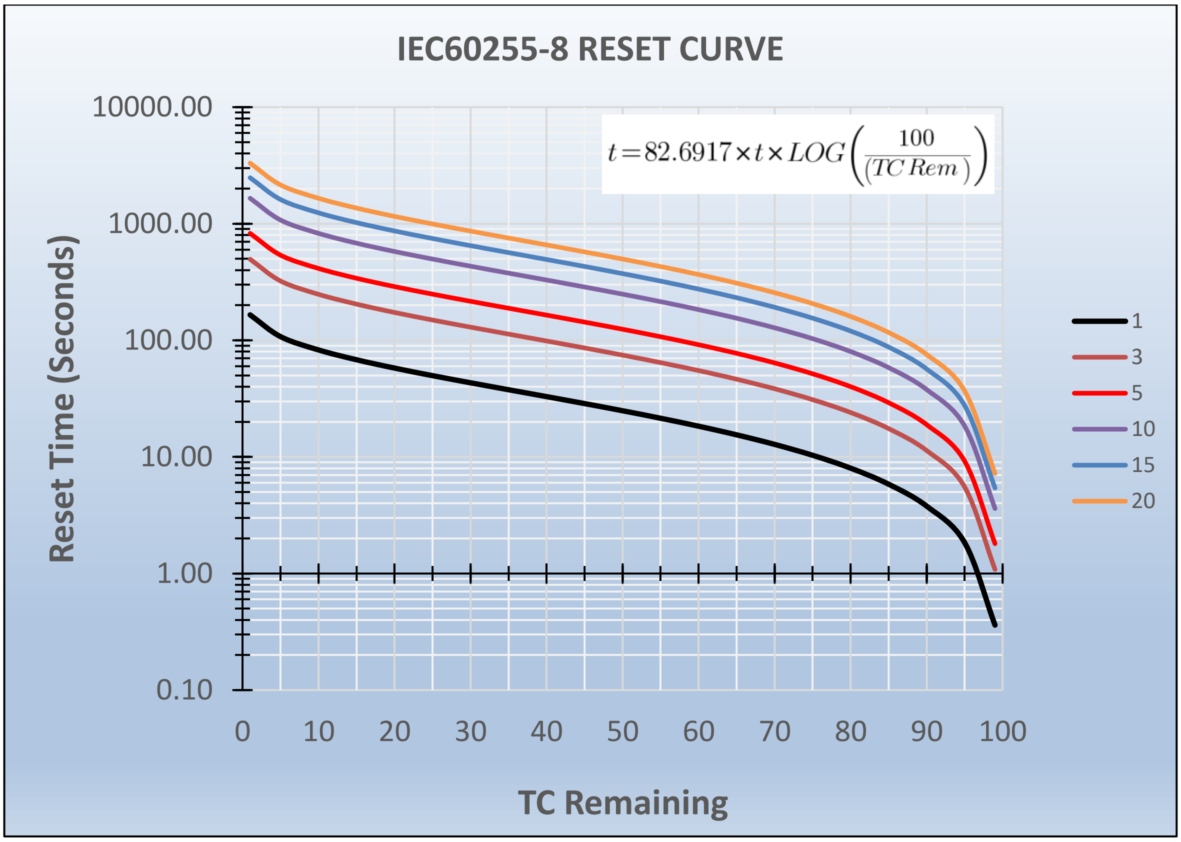
DESCRIPTIONS		
Parameter	**Range**	**Description**
Unit ID	8 characters	ID description of the NewFeed relay.
Description	12 characters	Long description name of the NewFeed relay.
Field input 1	8 characters	Description for field input 1
Field input 2	8 characters	Description for field input 2
Field input 3	8 characters	Description for field input 3
Field input 4	8 characters	Description for field input 4
Field input 5	8 characters	Description for field input 5
Field input 6	8 characters	Description for field input 6
Field input 7	8 characters	Description for field input 7
Field input 8	8 characters	Description for field input 8
Field input 9	8 characters	Description for field input 9
Field input 10	8 characters	Description for field input 10
Field input 11	8 characters	Description for field input 11
Field input 12	8 characters	Description for field input 12
Field input 13	8 characters	Description for field input 13
Field input 14	8 characters	Description for field input 14
Field input 15	8 characters	Description for field input 15
Relay 1	8 characters	Description for relay 1
Relay 2	8 characters	Description for relay 2
Relay 3	8 characters	Description for relay 3
Relay 4	8 characters	Description for relay 4
Relay 5	8 characters	Description for relay 5
Relay 6	8 characters	Description for relay 6
Relay 7	8 characters	Description for relay 7
Relay 8	8 characters	Description for relay 8
Internal comms. Bit 00	8 characters	Description for internal communication module word 0 bit 00
Internal comms. Bit 01	8 characters	Description for internal communication module word 0 bit 01
Internal comms. Bit 02	8 characters	Description for internal communication module word 0 bit 02
Internal comms. Bit 03	8 characters	Description for internal communication module word 0 bit 03
Internal comms. Bit 04	8 characters	Description for internal communication module word 0 bit 04
Internal comms. Bit 05	8 characters	Description for internal communication module word 0 bit 05
Internal comms. Bit 06	8 characters	Description for internal communication module word 0 bit 06
Internal comms. Bit 07	8 characters	Description for internal communication module word 0 bit 07
Internal comms. Bit 08	8 characters	Description for internal communication module word 0 bit 08
Internal comms. Bit 09	8 characters	Description for internal communication module word 0 bit 09
Internal comms. Bit 10	8 characters	Description for internal communication module word 0 bit 10
Internal comms. Bit 11	8 characters	Description for internal communication module word 0 bit 11
Internal comms. Bit 12	8 characters	Description for internal communication module word 0 bit 12
Internal comms. Bit 13	8 characters	Description for internal communication module word 0 bit 13

DESCRIPTIONS		
Parameter	**Range**	**Description**
Internal comms. Bit 14	8 characters	Description for internal communication module word 0 bit 14
Internal comms. Bit 15	8 characters	Description for internal communication module word 0 bit 15
External comms. Bit 00	8 characters	Description for external communication module word 0 bit 00
External comms. Bit 01	8 characters	Description for external communication module word 0 bit 01
External comms. Bit 02	8 characters	Description for external communication module word 0 bit 02
External comms. Bit 03	8 characters	Description for external communication module word 0 bit 03
External comms. Bit 04	8 characters	Description for external communication module word 0 bit 04
External comms. Bit 05	8 characters	Description for external communication module word 0 bit 05
External comms. Bit 06	8 characters	Description for external communication module word 0 bit 06
External comms. Bit 07	8 characters	Description for external communication module word 0 bit 07
External comms. Bit 08	8 characters	Description for external communication module word 0 bit 08
External comms. Bit 09	8 characters	Description for external communication module word 0 bit 09
External comms. Bit 10	8 characters	Description for external communication module word 0 bit 10
External comms. Bit 11	8 characters	Description for external communication module word 0 bit 11
External comms. Bit 12	8 characters	Description for external communication module word 0 bit 12
External comms. Bit 13	8 characters	Description for external communication module word 0 bit 13
External comms. Bit 14	8 characters	Description for external communication module word 0 bit 14
External comms. Bit 15	8 characters	Description for external communication module word 0 bit 15
Tele meter channel 1	8 characters	Description for tele meter channel 1.
Tele meter channel 2	8 characters	Description for tele meter channel 2.
Tele meter channel 3	8 characters	Description for tele meter channel 3.
Tele meter channel 4	8 characters	Description for tele meter channel 4.
Tele meter channel 5	8 characters	Description for tele meter channel 5.
Tele meter channel 6	8 characters	Description for tele meter channel 6.
Tele meter channel 7	8 characters	Description for tele meter channel 7.
Tele meter channel 8	8 characters	Description for tele meter channel 8.

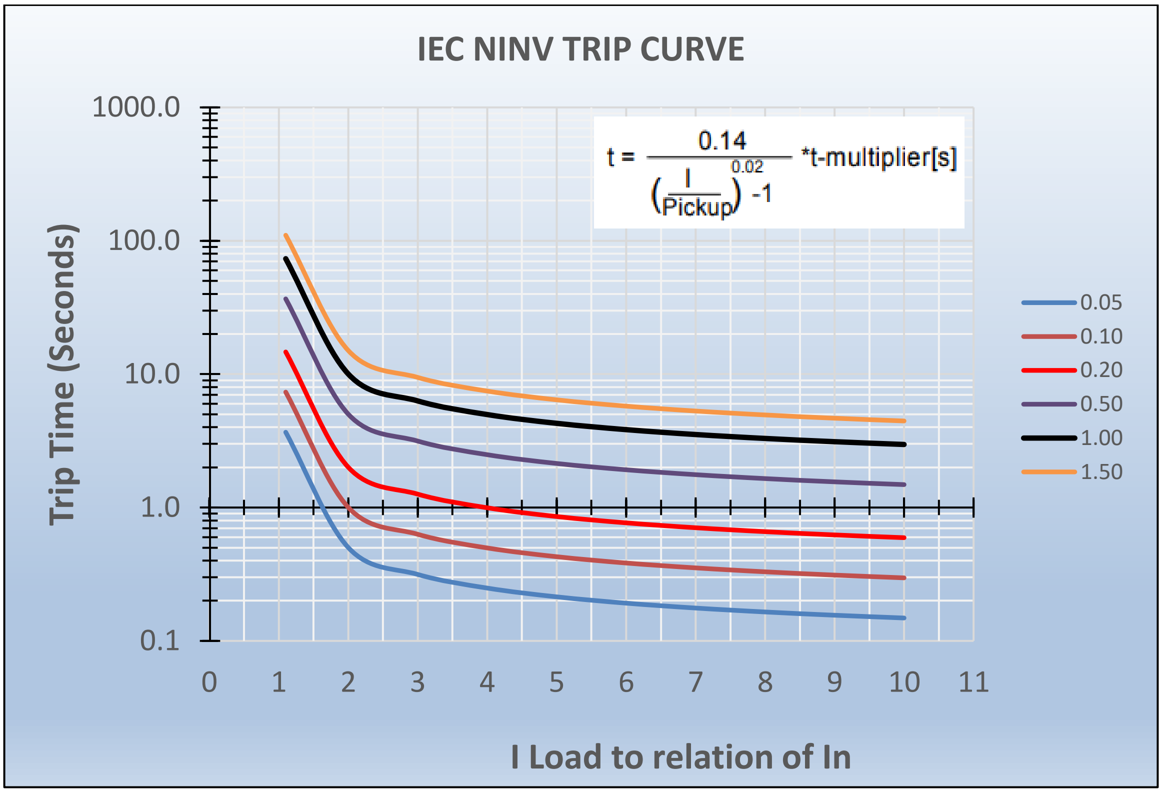
39 CURVE DIAGRAMS

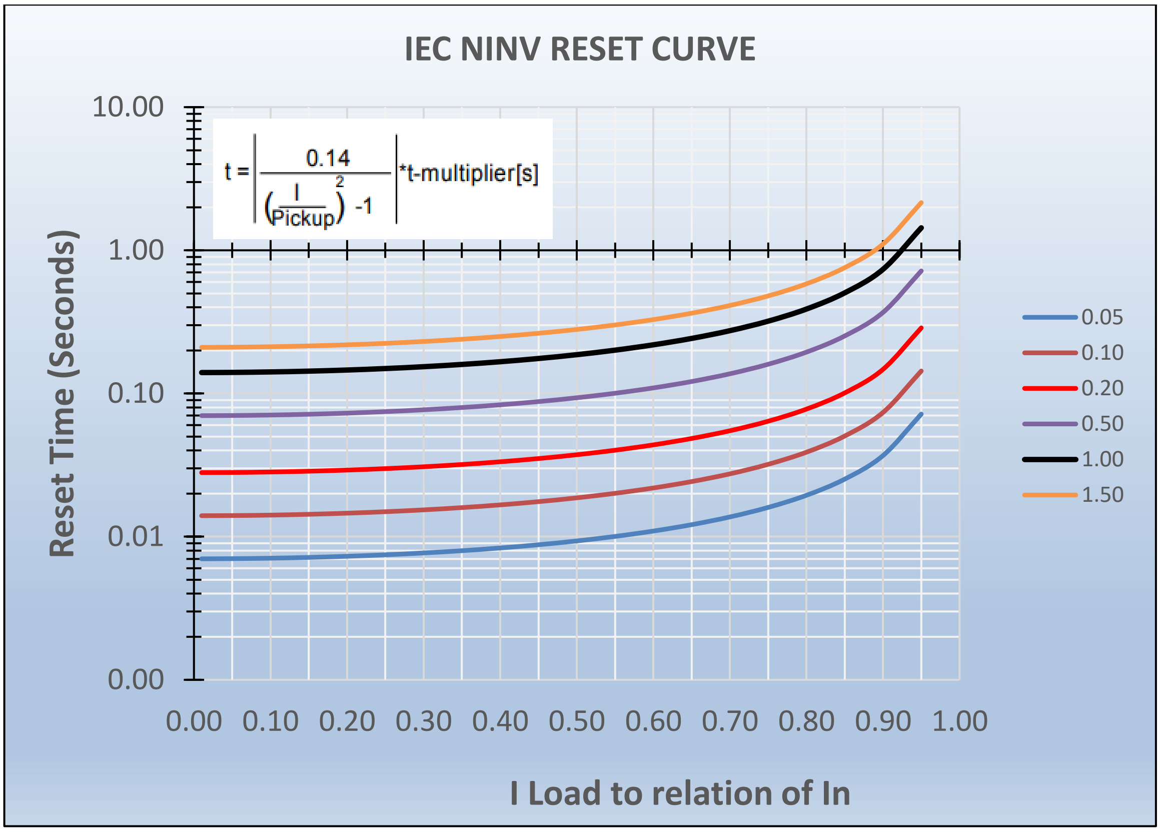
39.1 IEC60288-8



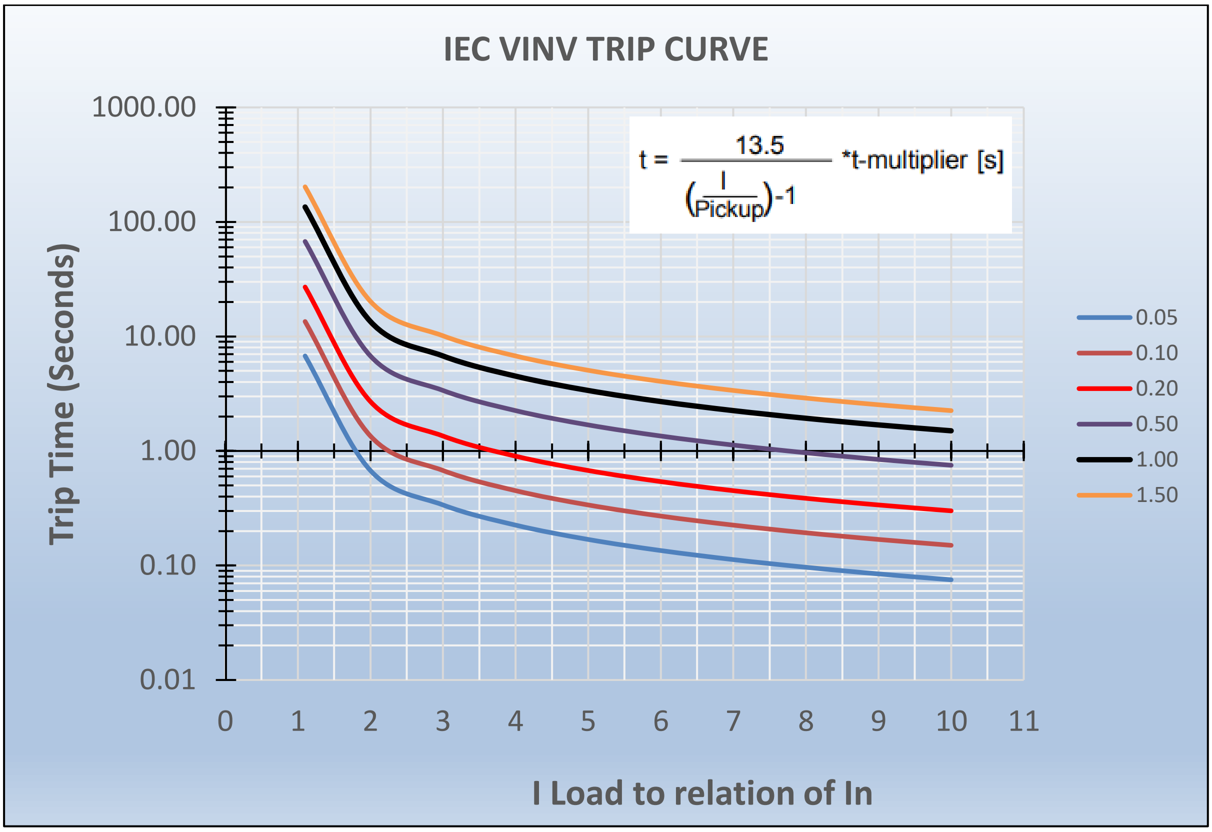


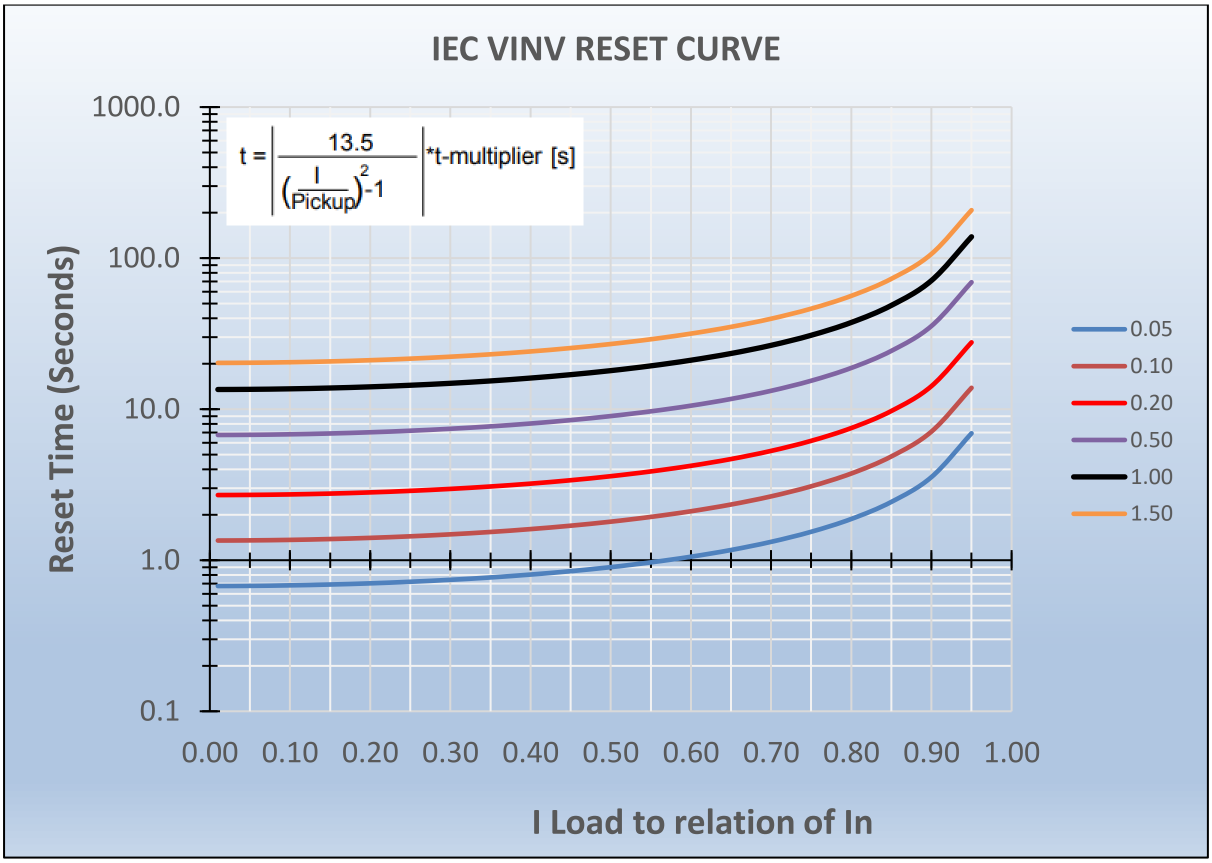
39.2 IEC NINV trip and reset curve



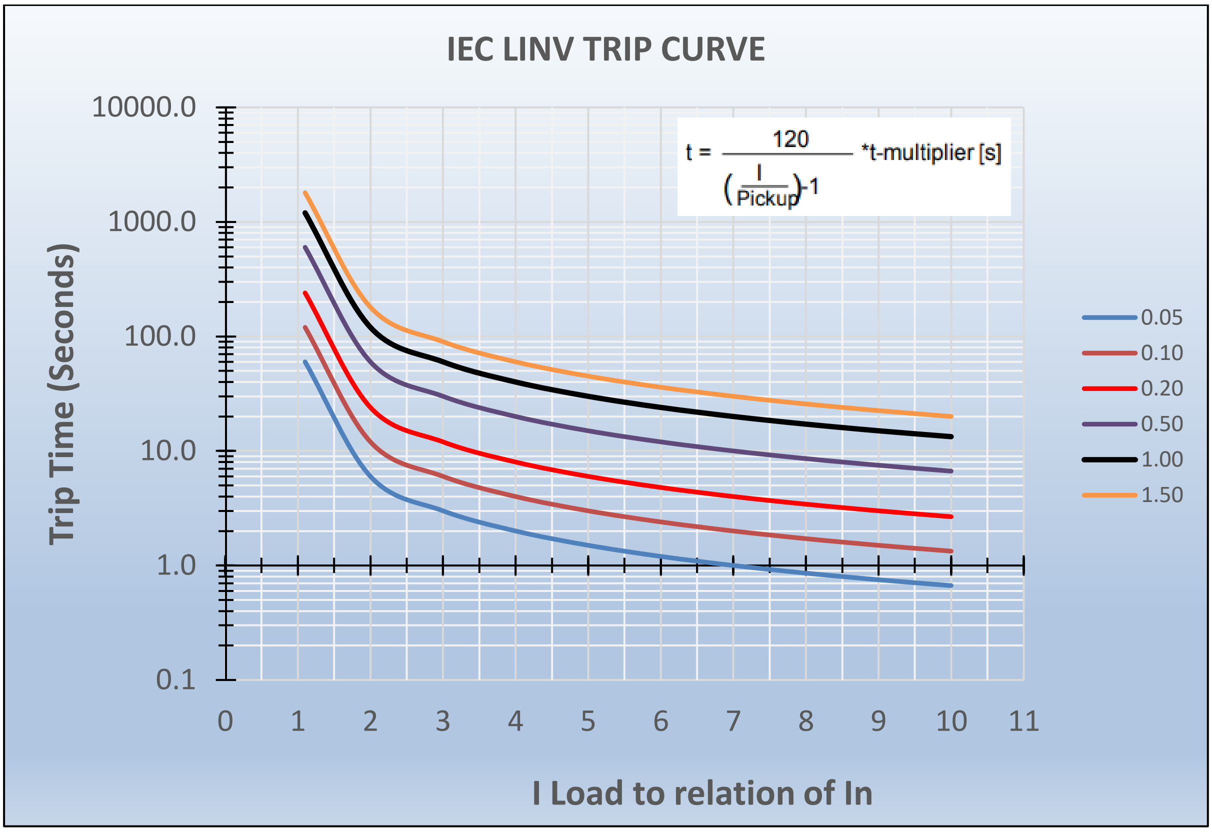


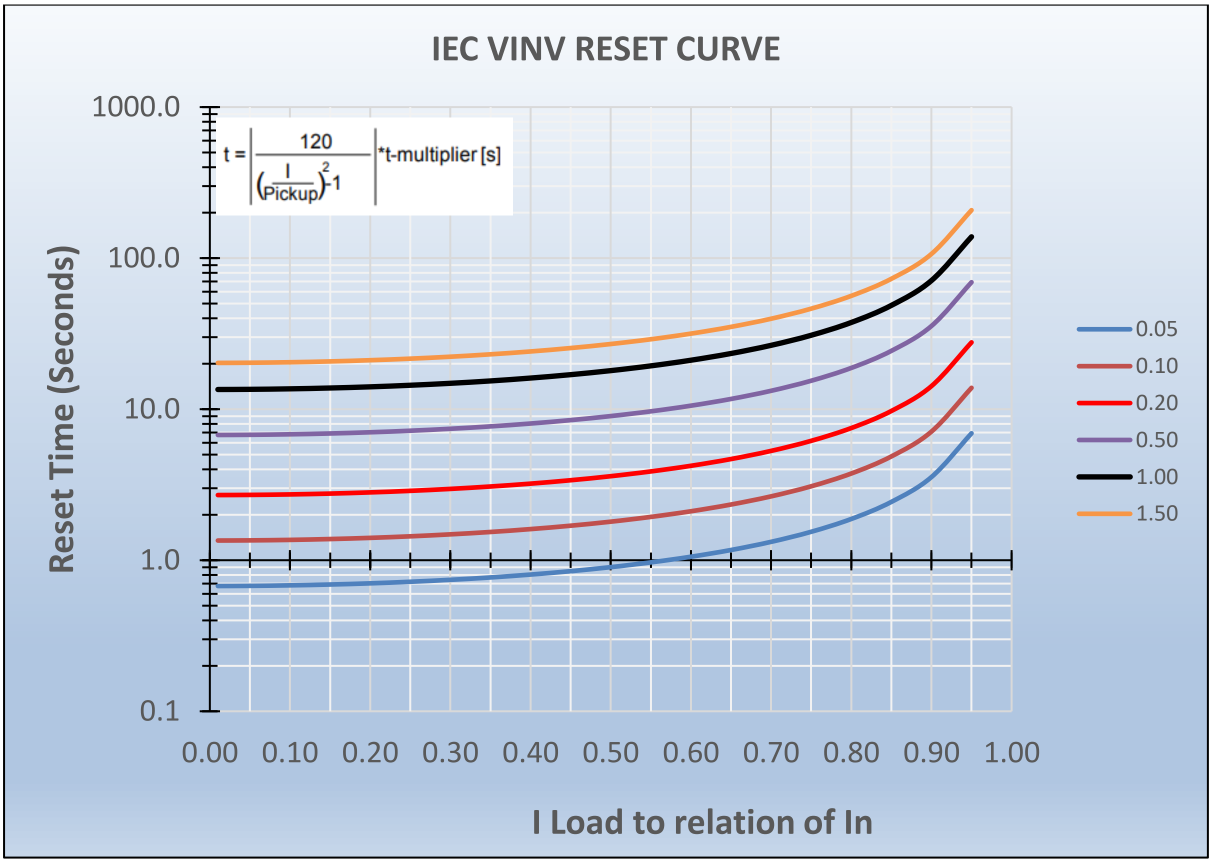
39.3 IEC VINV Trip and reset curve



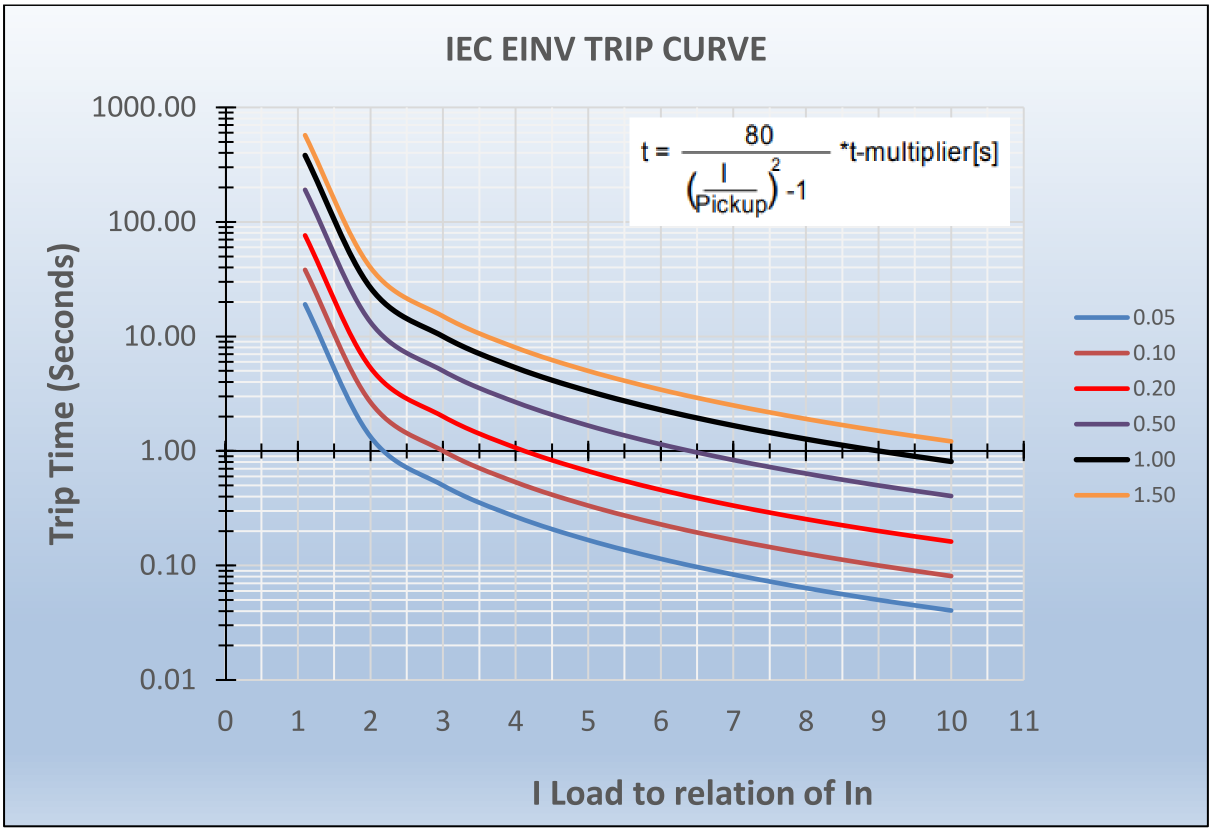


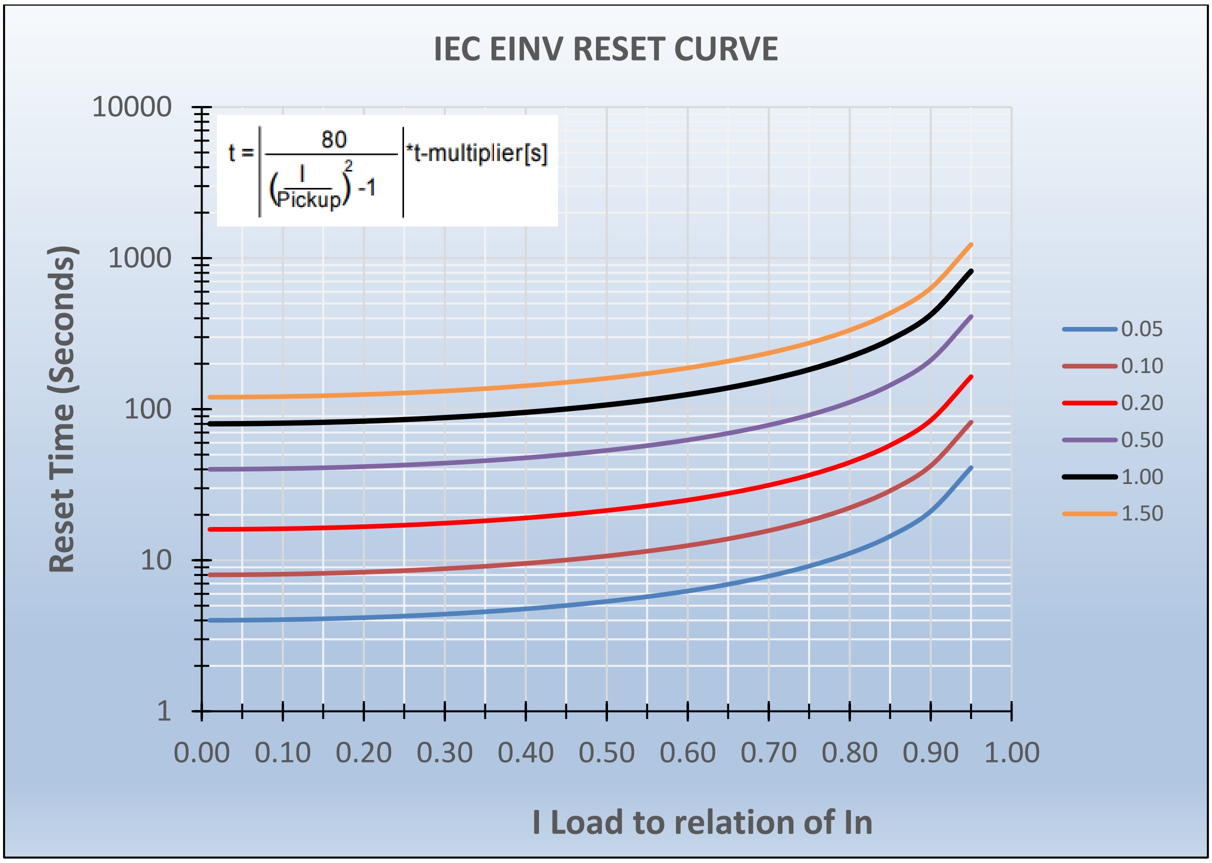
39.4 IEC LINV Trip and reset curve



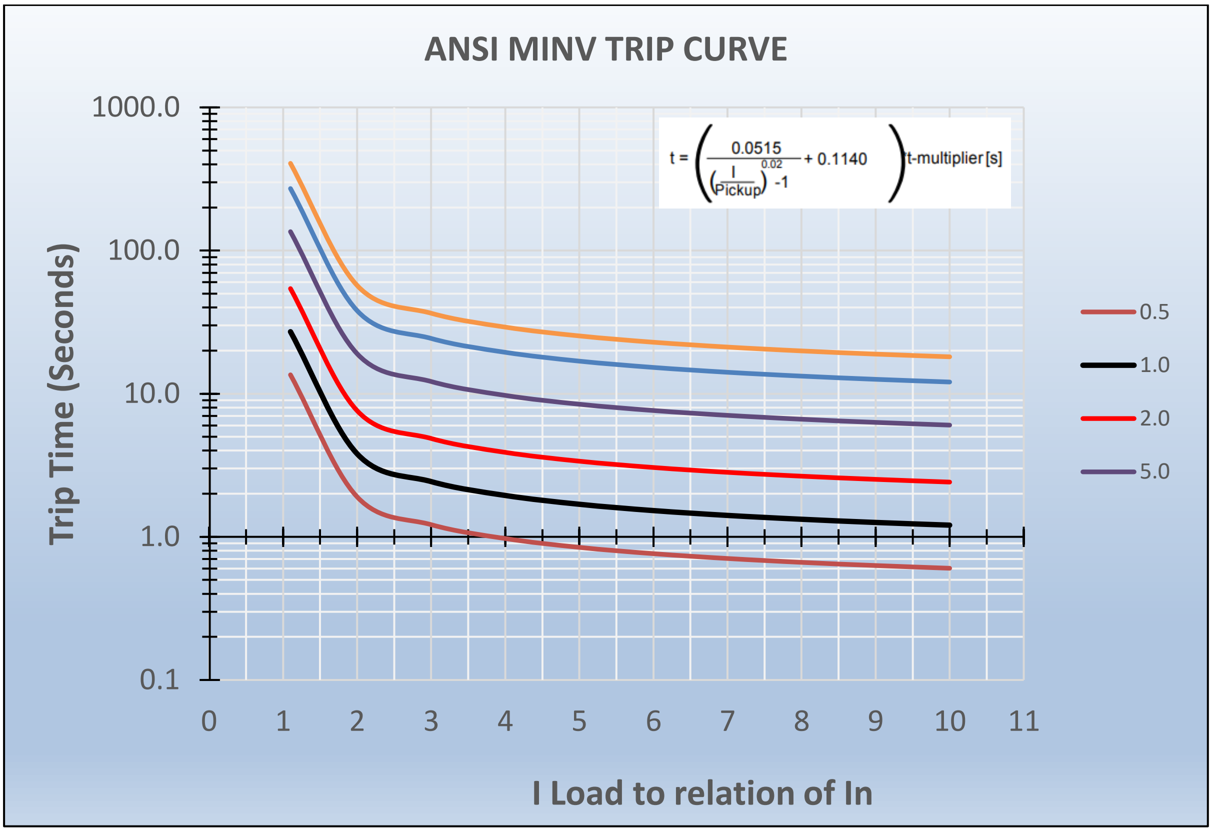


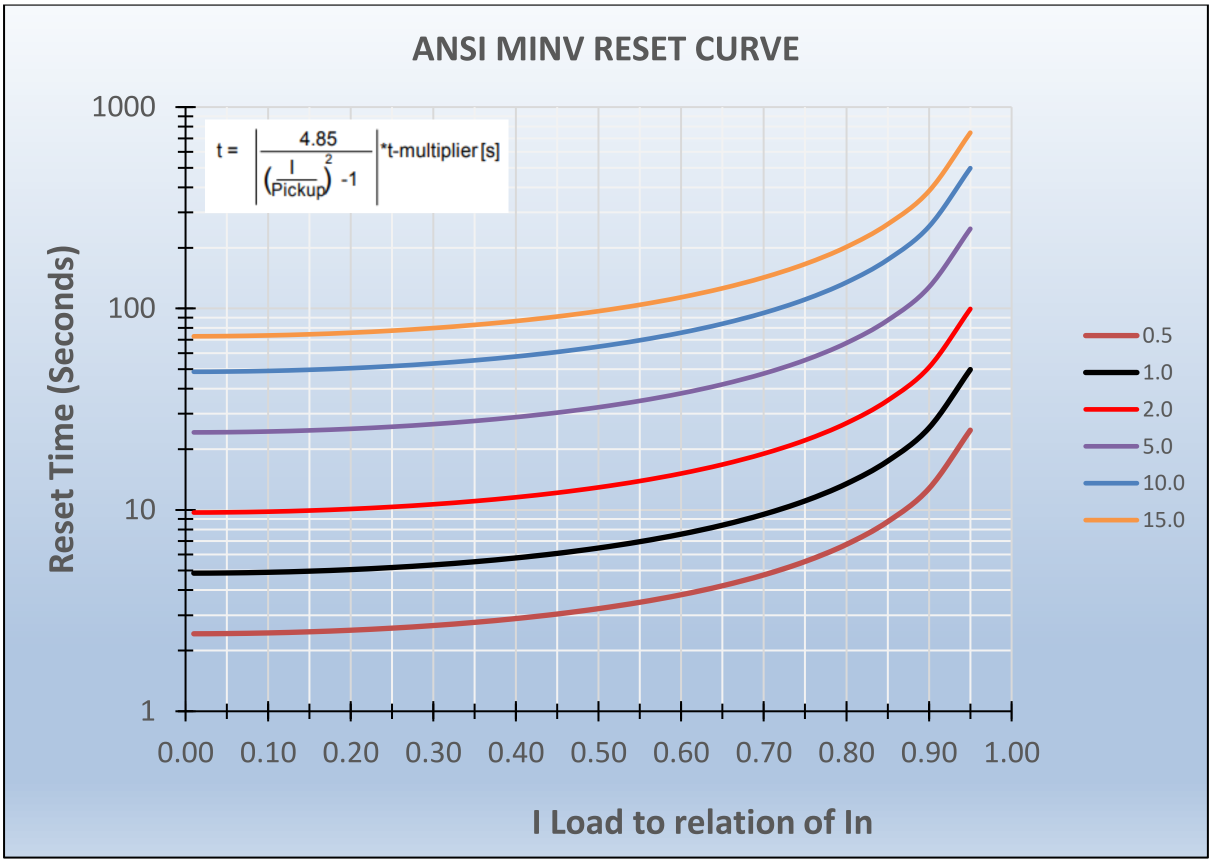
39.5 IEC EINV Trip and reset curve



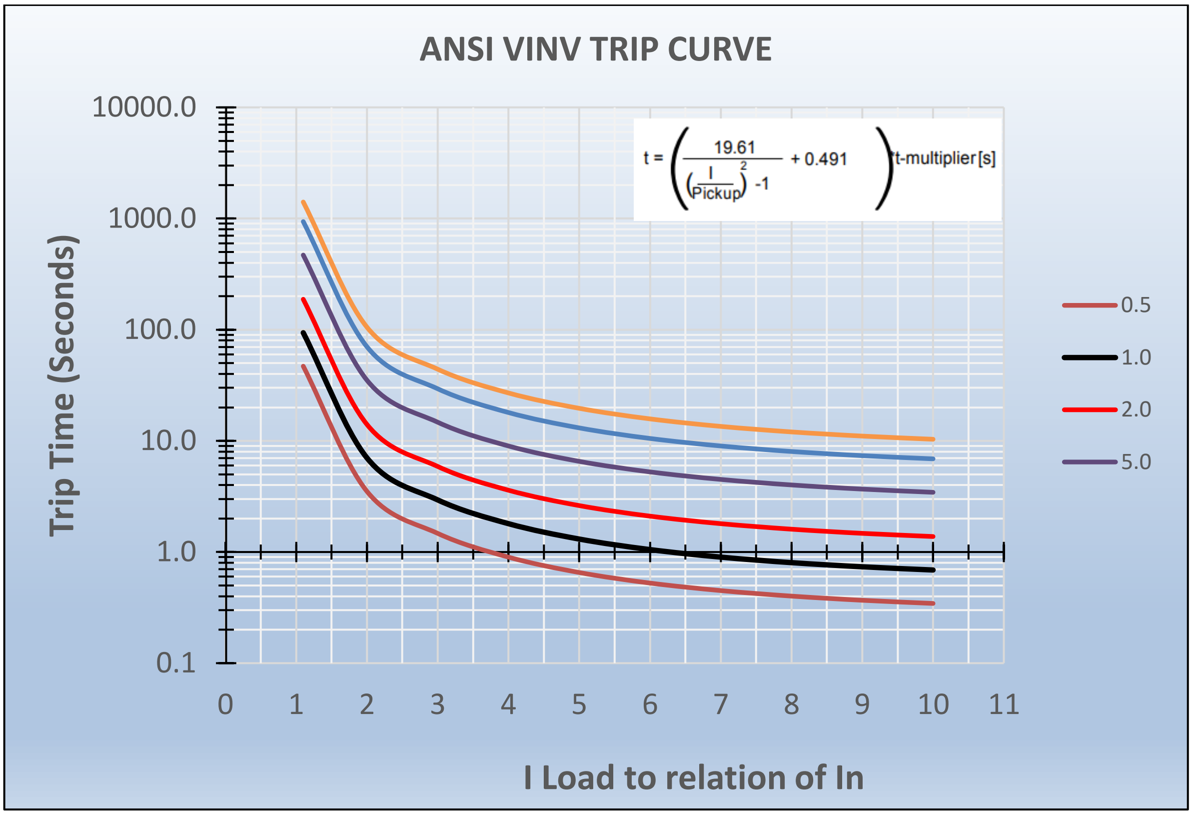


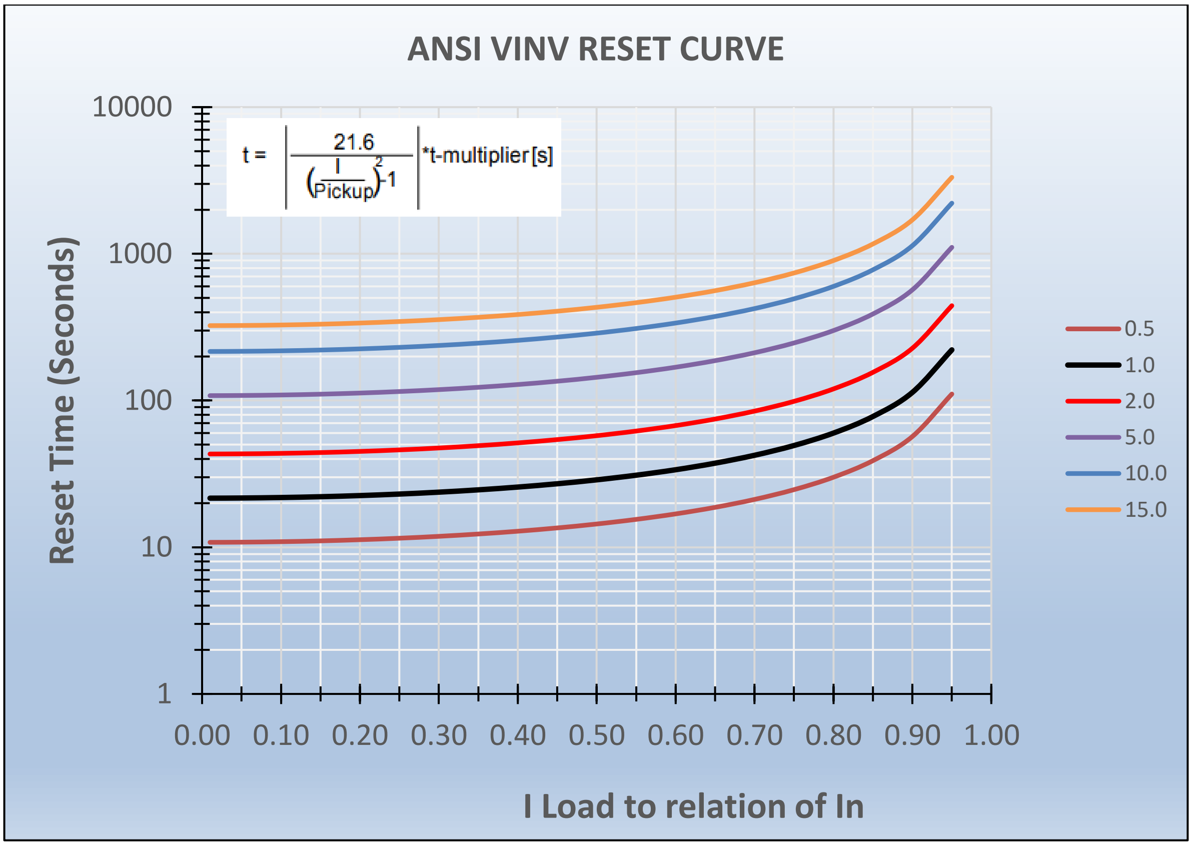
39.6 ANSI MINV Trip and reset curve



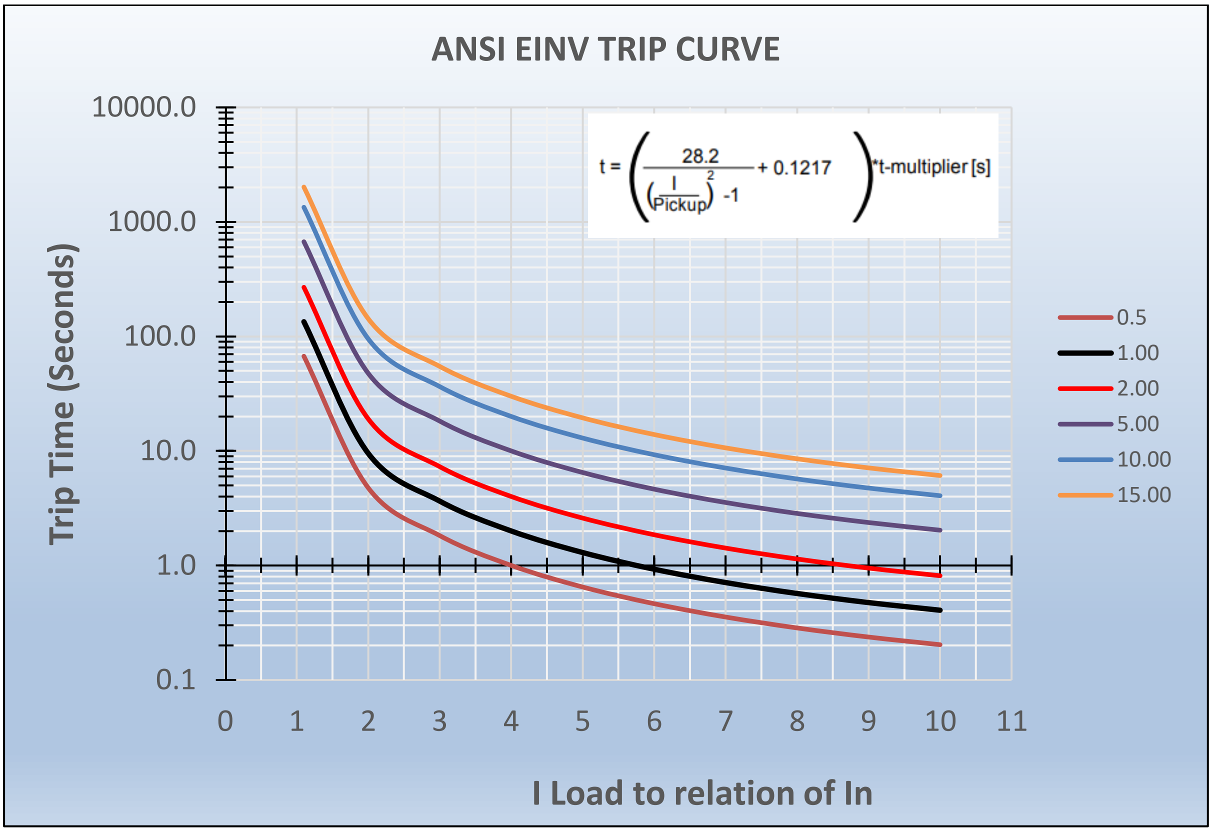


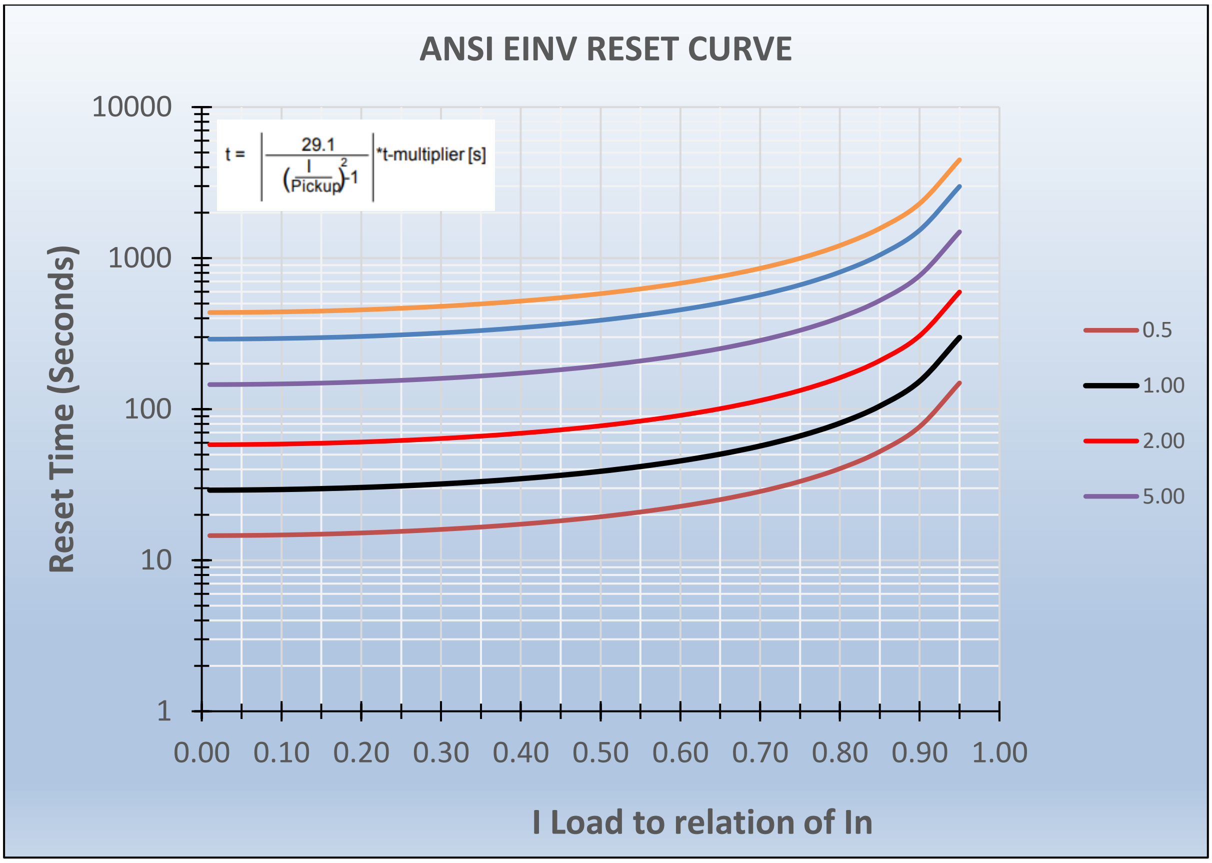
39.7 ANSI VINV Trip and reset curve



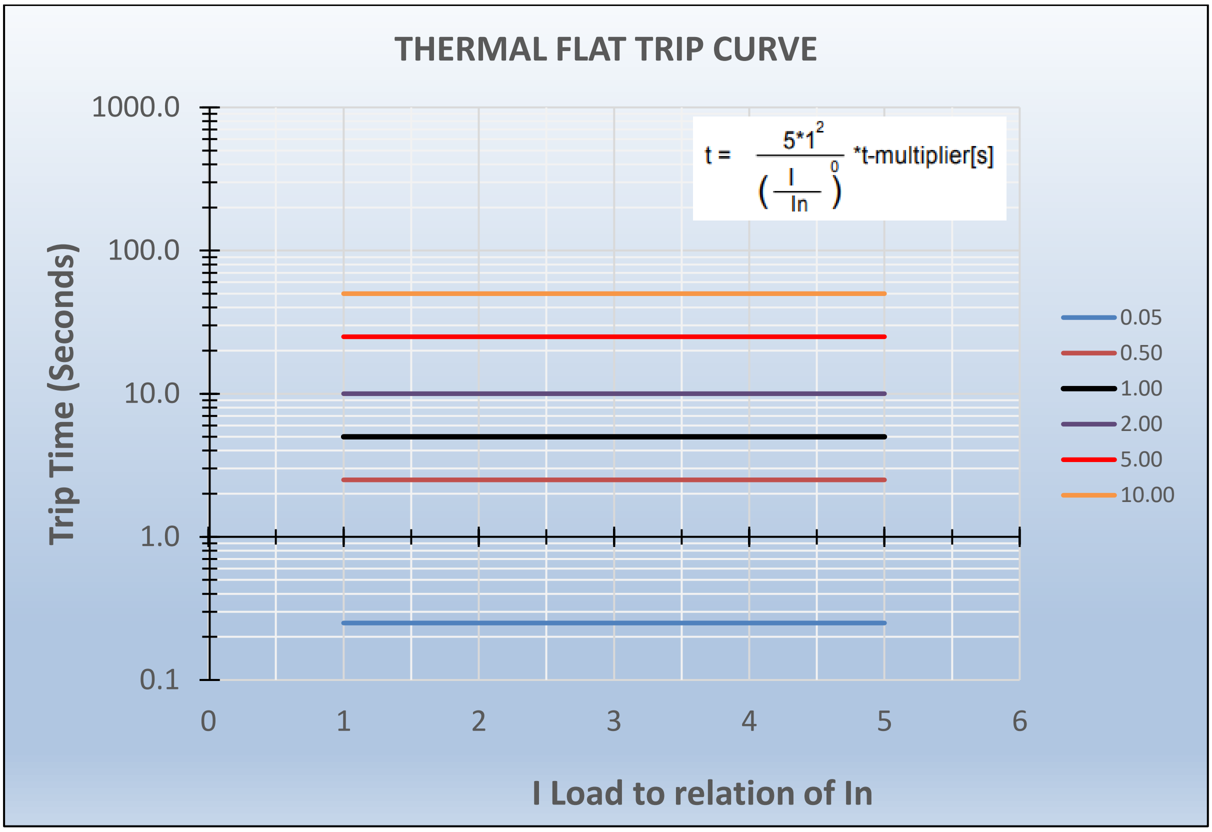


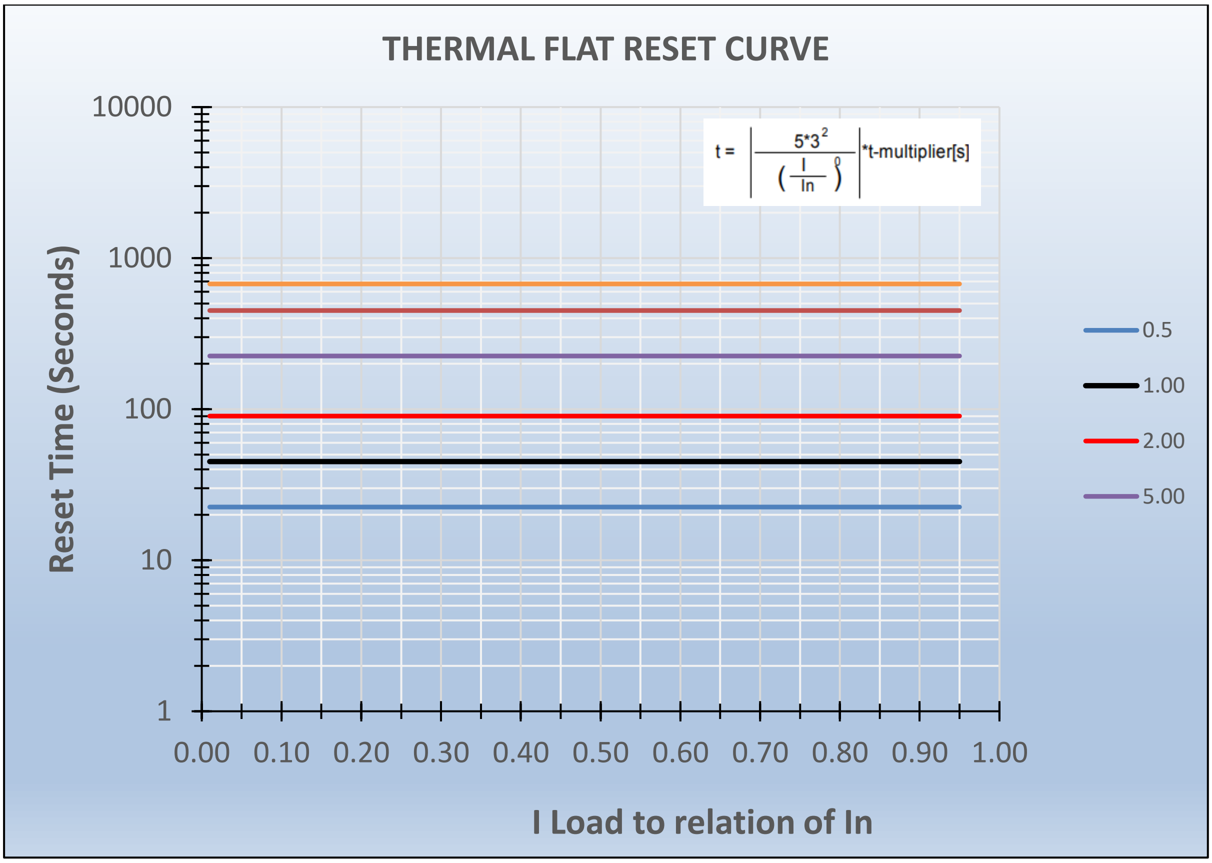
39.8 ANSI EINV Trip and reset curve



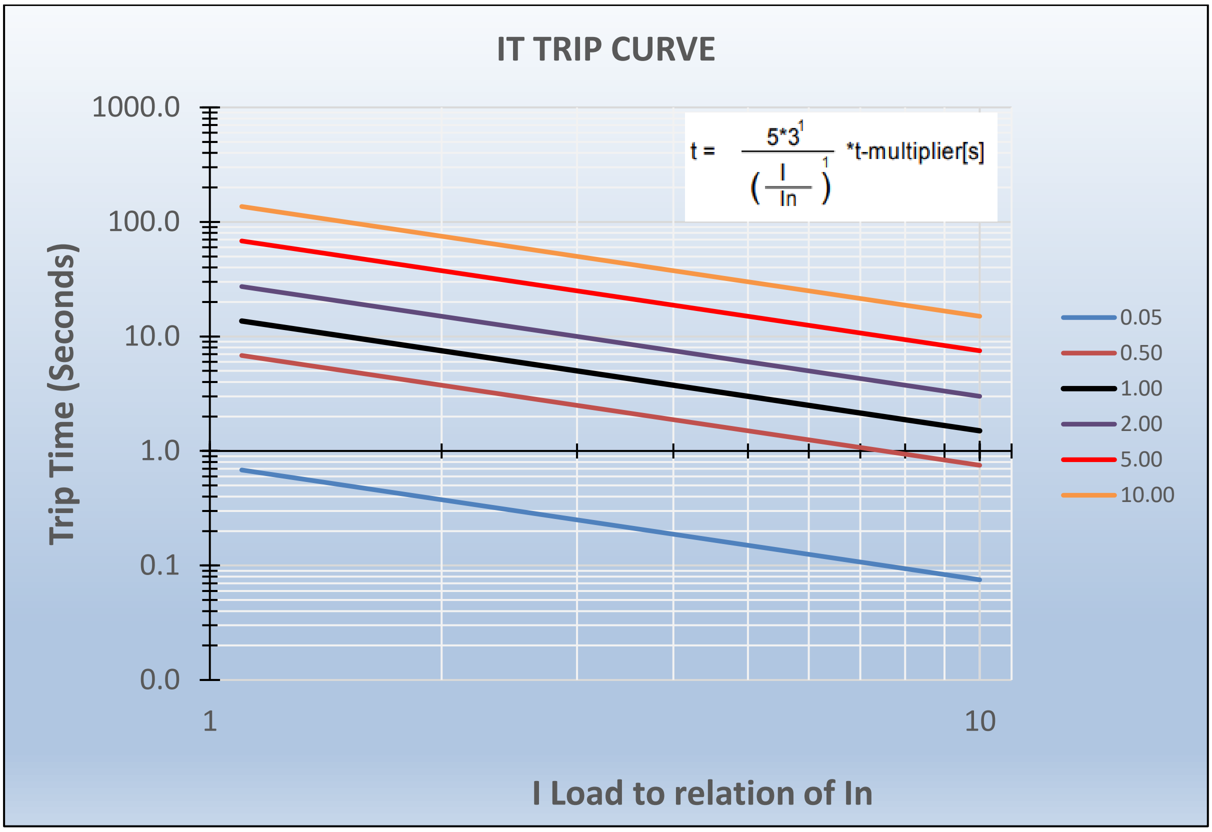


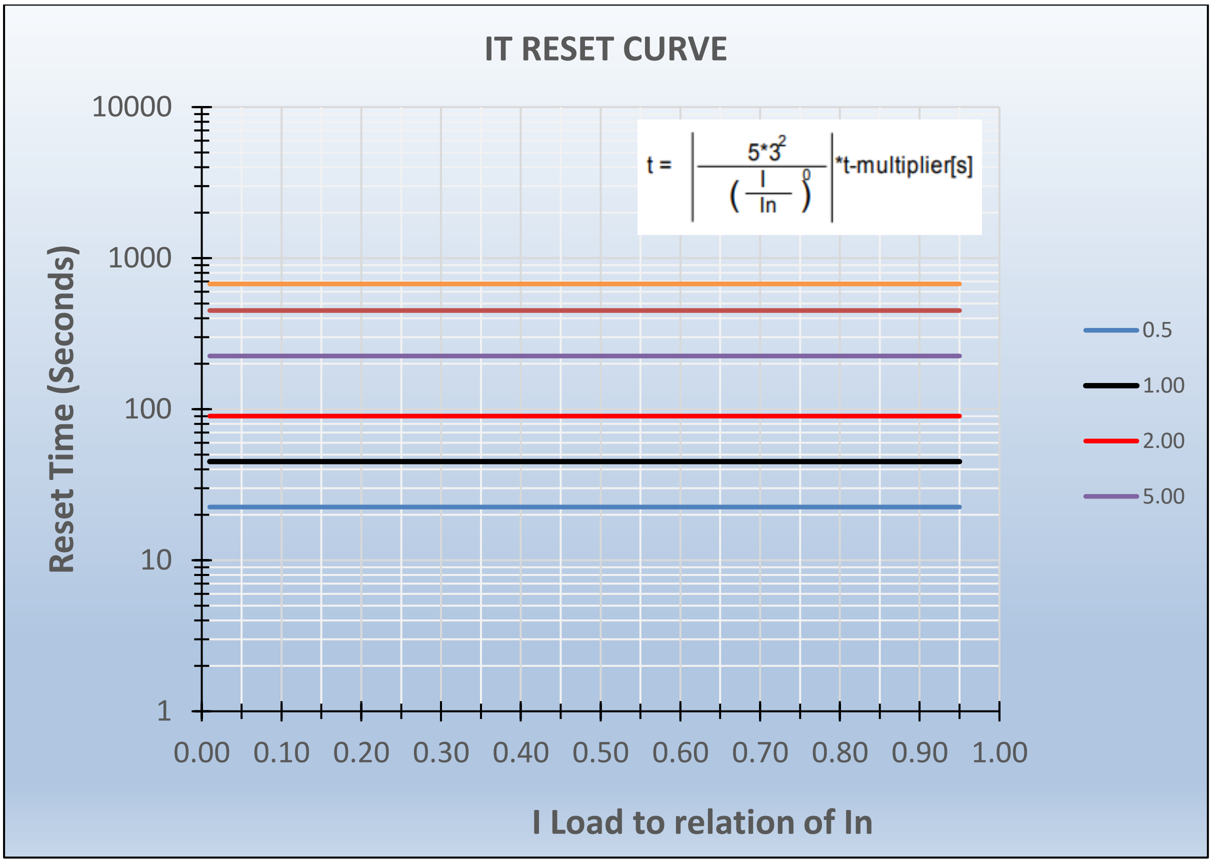
39.9 Thermal flat trip and reset curve



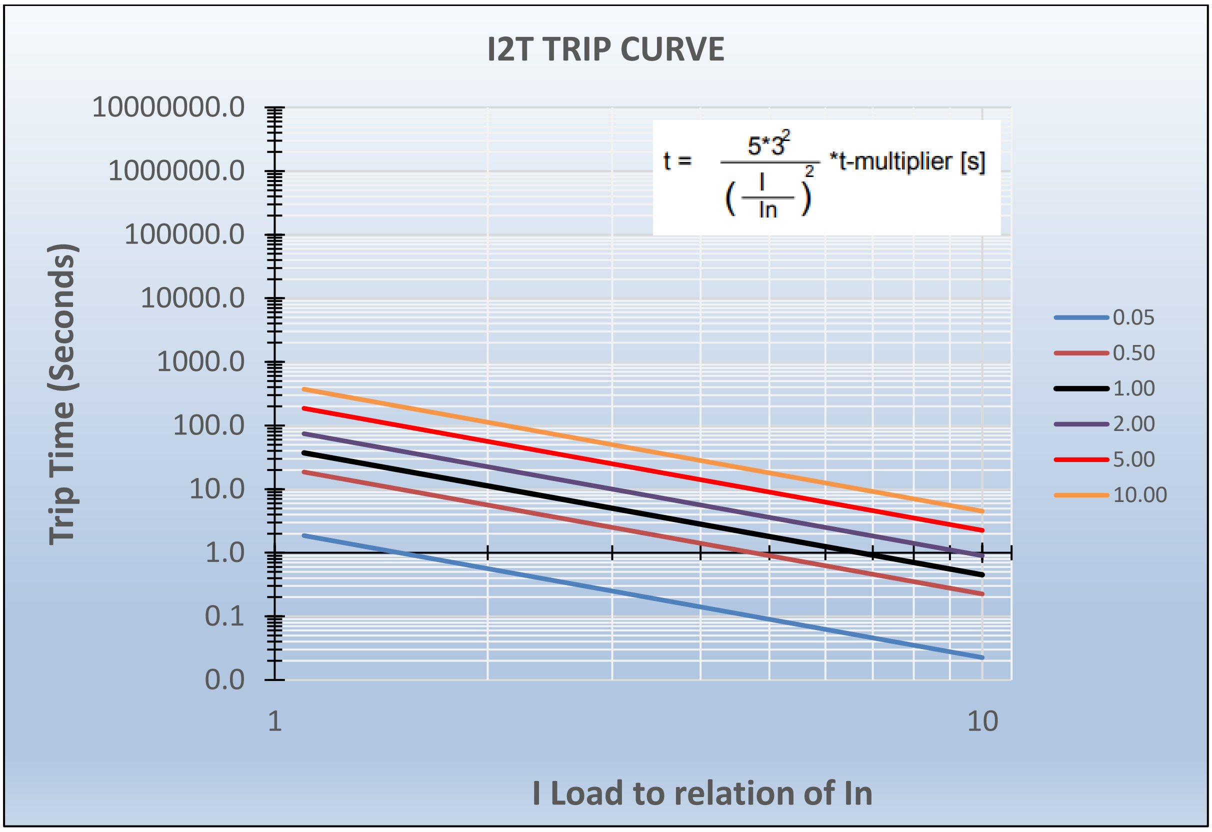


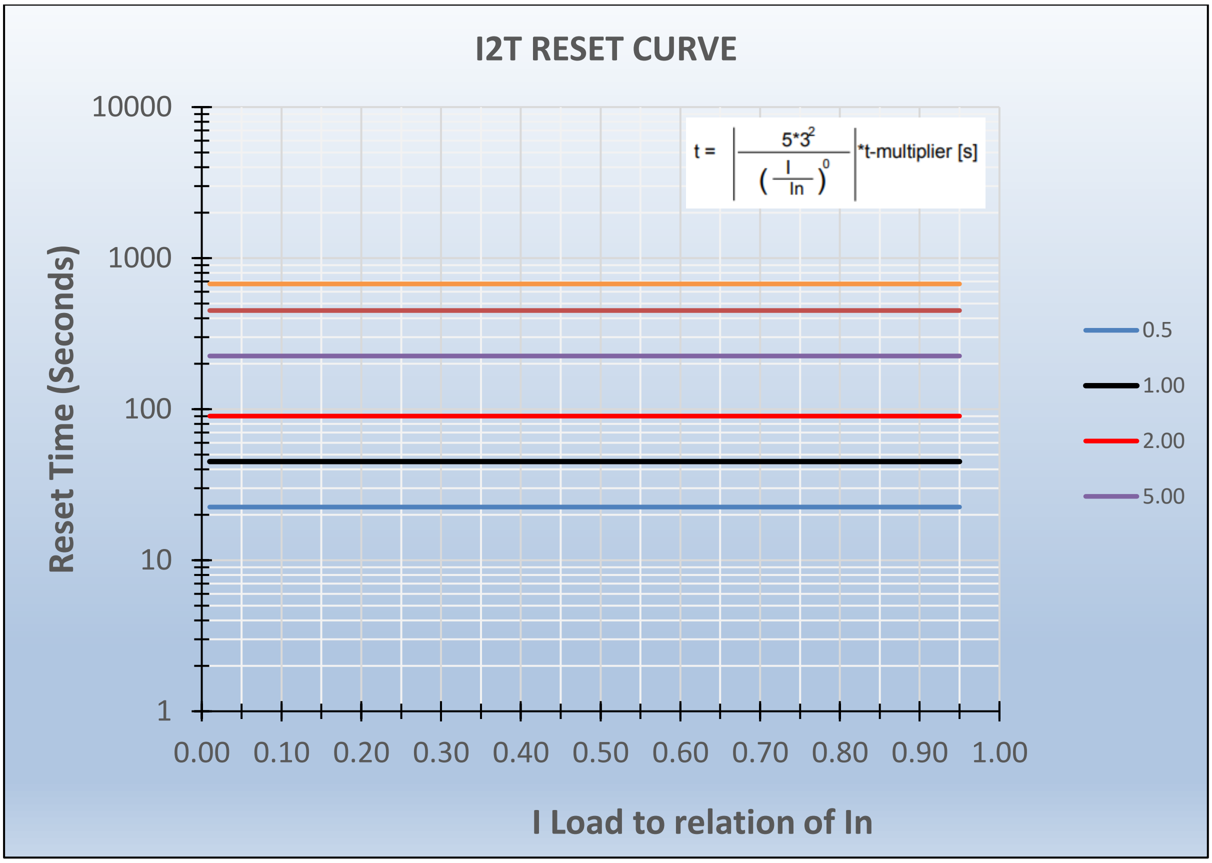
39.10 IT trip and reset curve





39.11 I^2T trip and reset curve





39.12 I^4T trip and reset curve