

## 1 GENERAL DESCRIPTION

**MPA2** is an electronic **Motor Performance Analyzer** that constantly monitors motor current and power supply voltage, using a thermal model algorithm to protect your motor against undercurrent, overload conditions, and voltage failures.



**WARNING:** Only qualified technicians with knowledge about overload relays and associated machinery should do the installation, starting up, and maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.



**CAUTION:** This product may start automatically, the user must take cautions to avoid hazards to people.

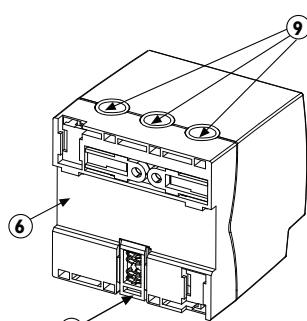
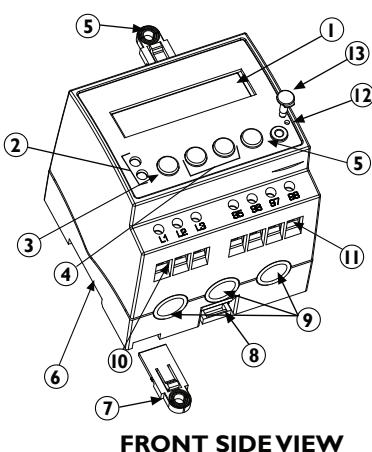


**CAUTION:** This product has been designed for industrial environments. Use of this product in residential environment may cause unwanted electromagnetic disturbances in which case the user may be required to take adequate mitigation measures.



**CAUTION:** An incorrectly applied or installed product can result in damage to the components or reduction in product life. Wiring or application errors, or operating/storing in excessive ambient temperatures may result in malfunction.

## 2 PARTS LIST



BACK SIDEVIEW

- 1. LCD display
- 2. Indicator light (LEDs):
  - Status Relay.
  - Failure .
- 3. START Push Button.
- 4. ADJUST Push Buttons (Up & Down).
- 5. SELECT Push Button.
- 6. Back Groove for DIN Rail mounting.
- 7. Attachable Mounting Ear for Flat Surface mounting.
- 8. Supporting Brackets for DIN Rail mounting.
- 9. Current Sensing Holes for motor wiring.
- 10. Power Supply Voltage Input (L1 L2 L3).
- 11. Contacts for Relay (95-96) and (97-98).
- 12. COM Port. (for Serial Communication).
- 13. COM PORT cover.

Tripped { 95-96 closed      Normal { 95-96 open  
97-98 open      97-98 closed

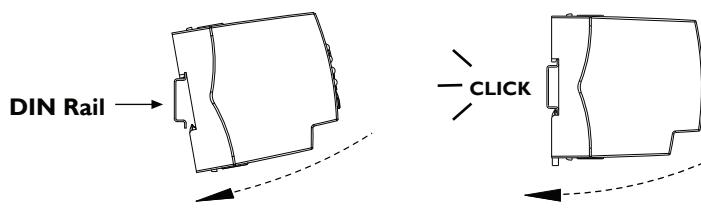
## 3 DIN RAIL MOUNTING



**CAUTION:** product must be installed in an accessible position free from dust, dirt, dampness, and vibration. Allow enough space for air circulation around the enclosure and easy access to all operator controls. Indoor use only.

### Instructions for Mechanical Installation

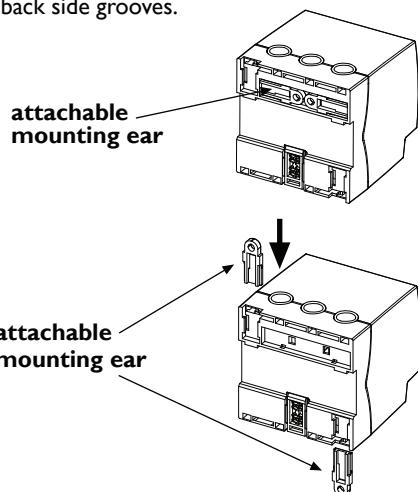
Place product at inclined position with its back side placed toward the upper edge of the DIN Rail and push down relay, as shown in figure until it does **CLICK** on the rail.



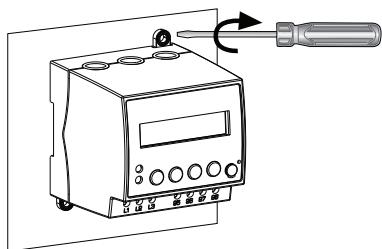
## 4 FLAT SURFACE MOUNTING

### Instructions for Mechanical Installation

a) Take off the two (2) attachable mounting ears located on the back side, insert and slip both attachable mounting ears into the back side grooves.

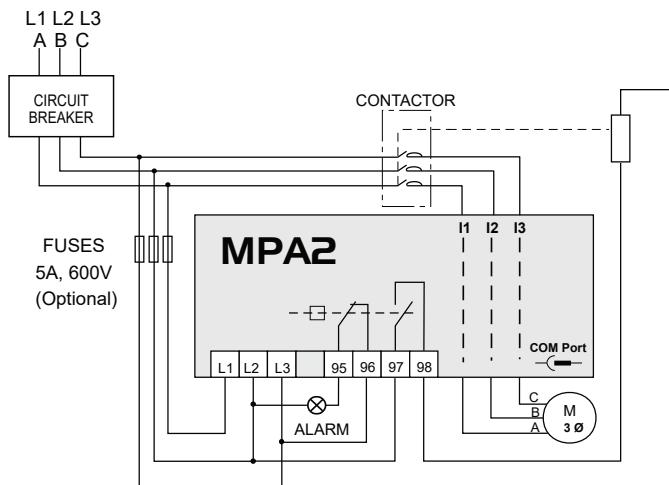


b) Place over flat surface panel and install it using a screwdriver suitable for screws  $3/16" \times 1/2"$ .

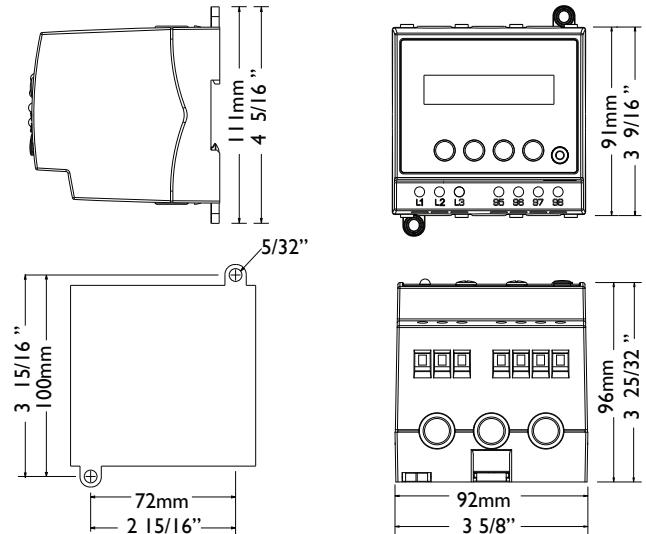


**Recommendation for Flat Surface Mounting:**  
Make two (2) holes ( $5/32"$ ) on panel surface before installing. See as reference the Guide for Flat Surface Mounting shown in point 5 (General Dimensions).

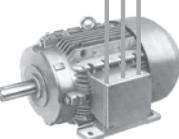
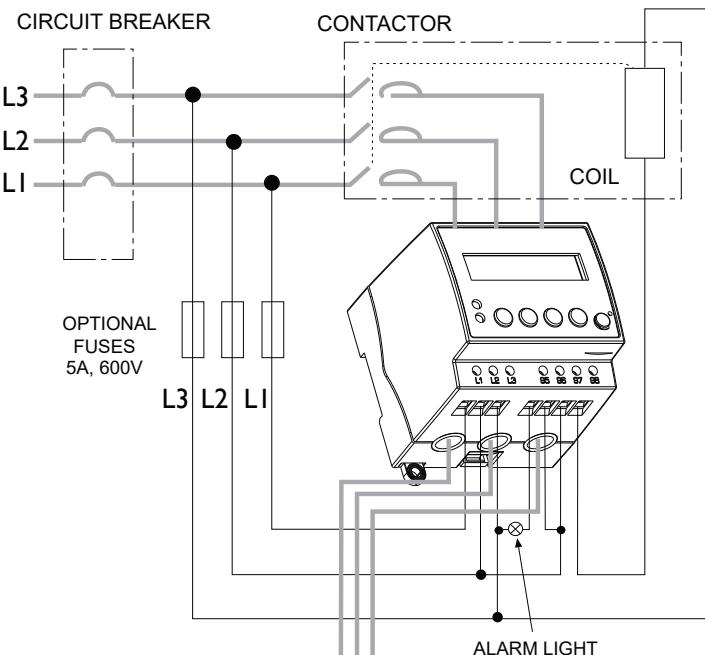
## 6.2 Basic Diagram Installation



## 5 GENERAL DIMENSIONS



Guide for Flat Surface Mounting



## 6 CONNECTION DIAGRAM



**WARNING:** (Risk of Electric Shock). Disconnect power supply before installing. Electric Shock will result in serious injury or death.



**CAUTION:** Check that the voltage and current of chosen model corresponds to the line voltage and motor current.

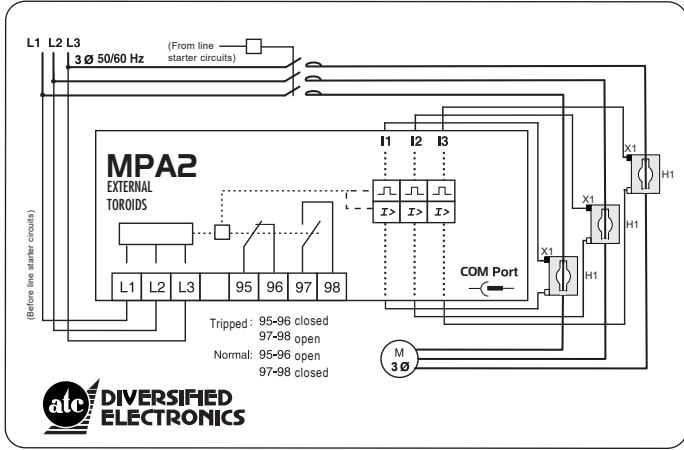
### 6.1 Terminal designation

TERMINAL	DESCRIPTION
L1	Voltage Input (Phase A)
L2	Voltage Input (Phase B)
L3	Voltage Input (Phase C)
95 }	Contact for
96 }	Auxiliary Relay
97 }	Contact for
98 }	Trip Relay
95-96	Closed
97-98	Open
95-96	Open
97-98	Closed

#### Recommendations for Wiring:

- Avoid over tightening the M3 screws upon terminals during wiring connection. Tightening Torque: 4.4 lbf-in, 5.1 Kgf - cm.
- Wire Strip Length  $1/4"$  (6-7 mm).
- Terminal wiring size: between AWG 10 and AWG 18.
- Current wiring size:  $\leq$  AWG 4,  $\varnothing: 7/16" (11mm)$ .
- Connect L1L2L3 terminal for Voltage Input in parallel connection before line starter circuit through Contactor (as shown in Basic Diagram Installation).
- Use three Current Sensing Holes for passing wires before connection to 3 phases motor. Using less than three (3) wires shall cause current unbalance wrong measures.

## 6.3 Diagram installation for external toroids



Refer to point 10 for detail explanation.

## 7 OPERATION

MPA2 constantly monitors current and voltage values. When any harmful condition occurs, the output connection is deactivated until the fault disappears and power line conditions return to an acceptable level. Specific timing such as Start Up Delay and Fault Detection Delay are incorporated to prevent nuisance tripping due to rapid power fluctuations.

Provides LCD Display to indicate the output status (voltage, current, unbalance, frequency and load status). Also provides four (4) push buttons (On/Off, Up, Down and Select) for electrical parameter adjustment such as Voltage, Current, Frequency, Fault Detection Delay and others. Besides these mentioned advantages, a Communication Port with MODBUS RTU protocol is included.

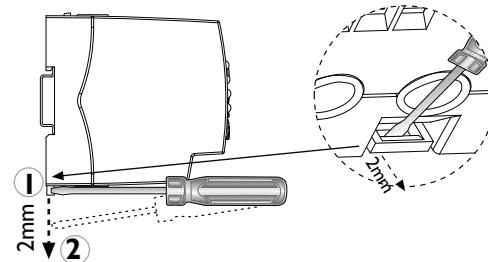
## 8 DISMOUNTING INSTRUCTIONS



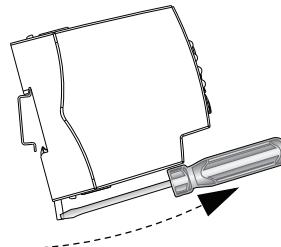
**WARNING:** Disconnect power supply (Circuit Breaker OFF) and electrical wiring before dismounting. Electrical shock will result in serious injury or death.

### 8.1 Instructions for Mechanical Dismounting (DIN RAIL)

a) Handling a Flat Screwdriver, pull downward the mounting bracket that you can see at rear and down side as shown in figure.



b) With screwdriver at position (2), pull out from DIN Rail as shown in figure:

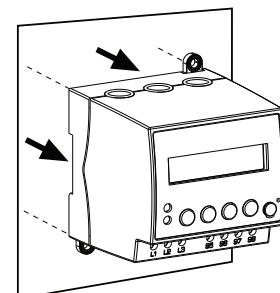
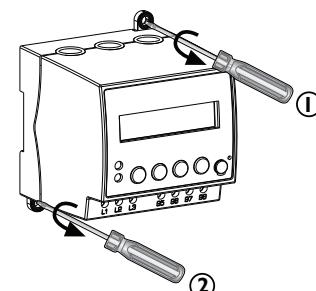


#### Recommendation for DIN Rail Dismounting:

Pull downward 2 mm with a soft movement when using screwdriver for dismounting. Strong movement could break the supporting bracket.

### 8.2. Instructions for Mechanical Dismounting (FLAT SURFACE)

Unscrew both screws fixed on Flat Surface through attachable mounting ears and then pull out the relay from flat surface as shown in figure.



## 9 SCREEN ADJUSTMENT

State Relay Screen

### I.1 Disconnected by MODBUS

220 220 200 7%  
OFF MODBUS

### I.2 OFF Schedule Timer

220 220 200 7%  
OFF SCHEDL TIMER

### I.3 Disconnected on MANUAL Mode

220 220 200 7%  
OFF MANUAL

### I.4 Disconnected by 3rd. Failure

220 220 200 7%  
OFF 3RD FAILS

### I.5 Start Up Delay (TC)

220 220 200 7%  
START DELAY 15"

### I.6 TC Because of Undercurrent

220 220 200 7%  
UC DELAY 100'

### I.7 Undervoltage (UV)

100 220 200 7%  
UV 100V V12

### I.8 Overvoltage (OV)

220 220 280 7%  
OV 280V V31

### I.9 Voltage Unbalance (VUB)

220 220 200 10%  
VUB 10%

### I.10 Frequency Shift (FS)

220 220 200 7%  
FS 63.6Hz

### I.11 Single Phasing (VSP)

120 100 200 7%  
VSP L2

### I.12 Phase Reversal (PR)

220 220 200 7%  
PHASE REVERSAL

### I.13 Accumulated Heat (%)

220 220 200 7%  
HEAT 50.4%

### I.14 Overheating

220 220 200 7%  
OVERHEAT

### 0 Initial Screen

Diversified  
Electronics

### 0.2 Starting screen

### 0.1 Initial Screen

MPA2 240V 4A  
2019 1,19 EN

**Main Screen**  
V12 V23 V31 VUB  
220 220 200 7%  
2 2 2 0%  
I1 I2 I3 CUB

**2 Measure kW-kVA-PF-kWH**  
110.0kVA 100.0kW  
0.95PF 290000kWH

**3 Faults Historical Register**  
19 17/05 20:50  
2000' UV 100V V12

**4 Motor Hours Counter**  
31/07/03 14:34  
TOTAL HRS 000025

**5 Motor Temperature, Frequency and START Mode**  
FREQ 60.0Hz  
MODE MANUAL

### Push Button Configuration

REARME ADJUSTMENT SELECT

### Special Functions

Press both push buttons at the same time in order to get the Adjustment Menu (Screen 7). If access to screen is locked, you must enter the password required.

Press both push buttons at the same time in order to get Quick Exit option.

Press SELECT to enter the chosen Adjusting Value.

Press both push buttons at the same time in order to get the Initial Screen 0.

### 6.1

WRONG PASSWORD  
XXXXXX

### 6

PASSWORD  
0000

### 7

Main Settings Menu  
VOLTAGE ADJUST  
CURRENT ADJUST  
CLOCK ADJUST  
SCHEDULE TIMER  
START MODE  
CHANGE PASSWORD  
MODBUS ADDRESS  
DELETE HISTORY  
RESTART  
EXIT

### 8.1

WRONG PASSWORD  
XXXXXX

### 8

PASSWORD  
0000

### 9

START MOTOR?  
YES / NO

### 7.1

UNDERVOLT. 180V  
OVERVOLT. 242V  
UNBALANCE 10%  
POWER FREQ. 60Hz  
FS 10%  
TRIP DELAY 30"  
START DELAY 600"  
EXIT

(Settings available for external toroids model)

CT 400/5  
NOMINAL I 3.0A  
TRIP CLASS 5

OVERLOAD 20%

UND.CURR TYPE NO

ACCEL. LR YES

HIGH INERTIA YES

3 FAILS OFF NO

EXIT

### 7.2.1

UND. CURR TYPE In  
TD UND. CURR. 600"  
SD UND. CURR. 10'  
EXIT

### 7.2.1.1

UND. CURR In 40%

### 7.2.1.2

UND. CURR PF 0.5

### 7.2.2

STARTING TIME 20'

### 7.3

TIME 13:50  
DATE 07/31/03

### 7.4

SCHEDL TIMER YES  
EVENT ADJUST

HOLIDAY ADJUST

EXIT

### 7.4.1

MTWTFSSH ON 00:00  
01/60 OFF 00:00

### 7.4.2

HOLIDAY 01/20  
DIA: 1 MONTH: 1

7.5

START MODE AUTO MANUAL

### 7.6

PASSWORD 0000

VERIFY PASSWORD 0000

7.6.1

MODBUS ADDRESS 001

### 7.7

DELETING....

### 7.8

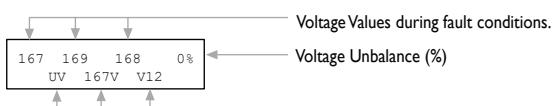
RECOVER FACTORY VALUES YES/NO

RECOVERING FACTORY VALUES

7.11.1

## Fault Screen Description:

### Undervoltage / Overvoltage (No. I.7 and No. I.8)



### Voltage, Frequency and Heat (No I.9 to I.14)



### Fault Type:

VUB for Voltage Unbalance  
FS for Frequency Shift  
VSP for Voltage Single Phasing  
PHASE REVERSAL

## Fault History Screen Description:



### GLOSSARY

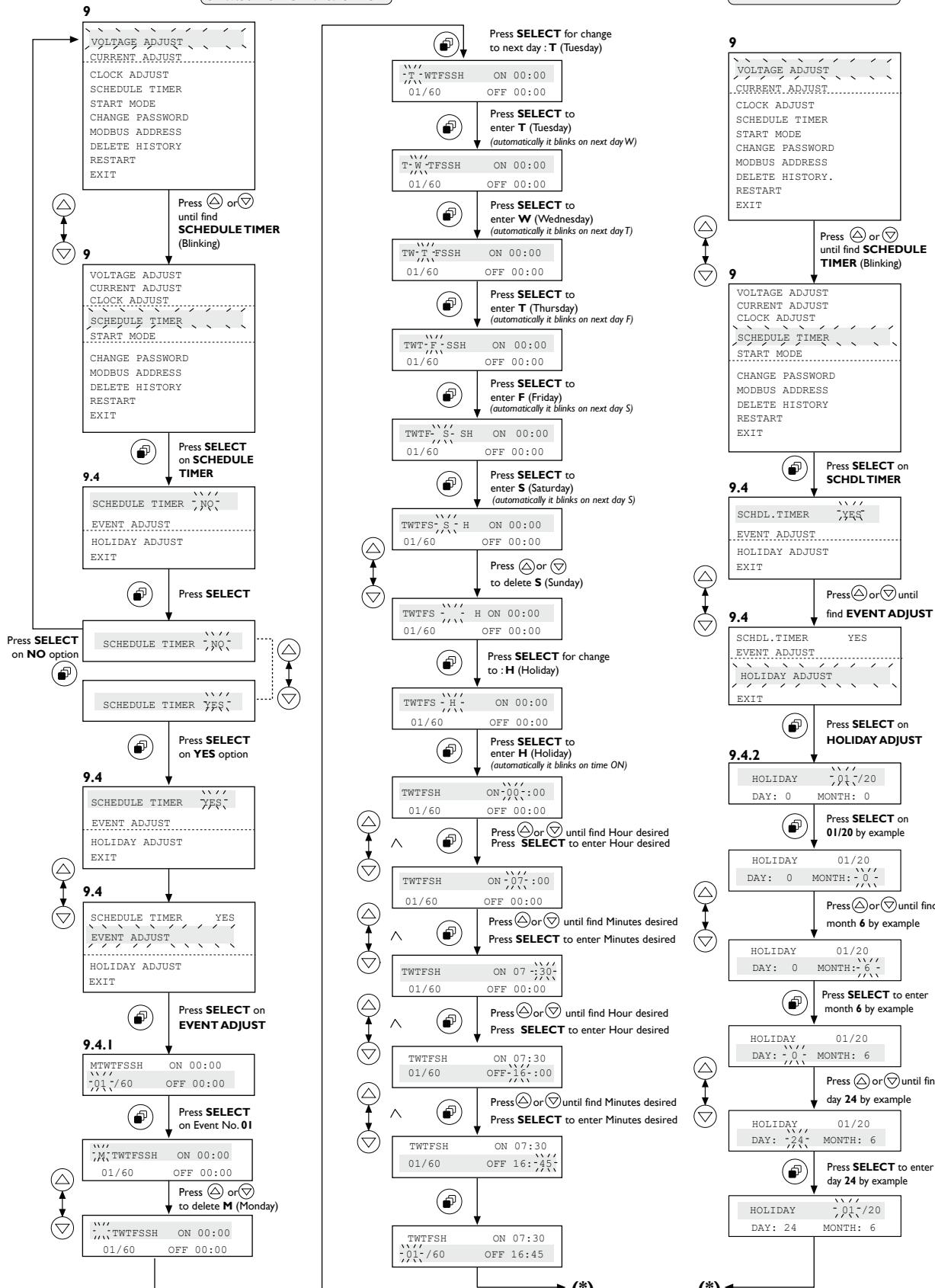
OL	OVERLOAD
UC	UNDERCURRENT
CSP	CURRENT SINGLE PHASE
CUB	CURRENT UNBALANCE
FS	FREQUENCY SHIFT
PR	PHASE REVERSAL
VSP	VOLTAGE SINGLE PHASE
LR	LOCKED ROTOR
VUB	VOLTAGE UNBALANCE
UV	UNDERVOLTAGE
OV	OVERVOLTAGE
V	VOLTAGE
I	CURRENT
PF	POWER FACTOR
TD	TRIP DELAY
TC	START UP DELAY
TEF	TOTAL ENERGY FAULT
SM	START MOTOR

### ABBREVIATIONS

TEMP.	TEMPERATURE
OVERVOLT.	OVERVOLTAGE
UNDERVOLT.	UNDERVOLTAGE
UND.CURR.	UNDERCURRENT
ADJ.	ADJUST
HRS	HOURS

## 9.1 Schedule Timer Adjustment Guide

**EVENT 01** (example):  
From Tuesday to Saturday and Holiday  
**ON:7:30 hrs - OFF: 16:45 hrs**



(\*) If you require to adjust a new EVENT or HOLIDAY, press  or  to look for the number to assign and then press  to enter it. It will take you to screen 9.4.1 (for Events) or 9.4.2 (for Holiday). Follow the indicated example steps shown above. If you want to exit, press  and  and you will go to screen 9.4.

## 9.2 Technical specifications

### A) Power Supply Circuit

a.1	Rated Voltage, Ue	208/220/240	440/480	VAC
a.2	Voltage Operation Limits, Ue	145 → 312	264 → 672	VAC
a.3	Average Consumption, In	45 mA	—	—
a.4	Rated Frequency, Fn	50/60 Hz	—	—
a.5	Frequency Operation Limits, Fn	42 → 70Hz	—	—
a.6	Rated Duty	Uninterrupted Duty	—	—

### B) Environmental Conditions, Operation Limits and Installing

b.1	Designed according to European Standards	IEC61010-1, IEC60255-6 IEC60947-1	LVD & EMC
b.2	Designed according to US Standards	—	—
b.3	CE Marking	CE (pending), Low Voltage Devices	IEC60947-1
b.4	Ambient Air Temperature (Operation)	-5 °C to 55 °C (23 °F to 131 °F)	—
b.5	Ambient Air Temperature (Storage)	-10 °C to + 70 °C (14 °F to 158 °F)	—
b.6	Maximum Relative Humidity	85% R.H.	—
b.7	Vibrations	Class 1, Amplitude <0.035mm or 1G 10Hz < f < 150Hz	IEC 60255-21-1
b.8	Degree of Protection	IP20, Protected against objects > 12.5mm, but no protection against water	IEC 60529
b.9	Pollution Degree	Degree 3	IEC 60255-5
b.10	Overvoltage Category	Category III	IEC 60255-5
b.11	Rated Insulation Voltage	500V	IEC 60255-5
b.12	Impulse Voltage Test	5 KV	IEC 60255-5
b.13	Impulse Dielectric Test	2,5 KV 50/60 Hz@1min	US Standards
b.14	Flammability Rating of Enclosure	V-0	US Standards
b.15	Enclosure Material	Polymers: PC, ABS, NYLON	—
b.16	Mounting Position	Any Position	—
b.17	Mounting Features	Symmetrical DIN Rail	IEC 715, DIN 43880
		Flat surface mounting, screw 3/16" x1/2"	NEMA Style
b.18	Terminal Screw Type	Flat M3	—
	Tightening Screw Torque	5.1 Kgf x cm (4.4 lb x in)	—
b.19	Terminals Wiring	10-18WG	—
		Ø ≤ 11mm AWG 4	—
b.20	Dimensions	92 x 91 x 96 (LxWxH)	—
b.21	Weight	494 (1,09)	g/lb

### C) Control Characteristics

c.1	Output Contact Rating	B 300 Pilot Duty 1 A@240 VAC/0,5 A@480 VAC	US Standards
c.2	Electrical Life Expectancy	100.000 Operations	—
c.3	Mechanical Life Expectancy	10.000.000 Operations	—
c.4	Utilization Category	AC-15, Capacity for loads> 72 VA	IEC60947-5-1

### D) Range Setting, Measuring

(According to Voltage Model)	240	480	VAC
d.1	Voltage Measurement Range, Um	0 → 312	0 → 672 VAC ± 2% accuracy
(According to Current Model)	04	12	32
d.2	Current Measurement Range, Im	1.5 → 40	0.3 → 125 A, ± 2% accuracy

Other measured parameters		
d.3	Frequency Range	45.0 → 70.0 Hz
d.4	Instantaneous Power Factor	0.00 → 1.00
d.5	Instantaneous Reactive Power KVA	0.0 → 999.9 KVA
d.6	Instantaneous Real Power KW	0.0 → 999.9 KW
d.7	Energy KWH	0 → 999999 KW/H
d.8	Total Motor Running Time (hours)	0 → 999999 H

### E) Algorithms and Protection Functions

(According to Operation Voltage )		240	480	VAC Level settings
e.1	Undervoltage (UV)@Imotor=0 or OL	165 → 225	350 → 460	—
e.2	Oversupply (OV) @ Imotor=0 or OL	215 → 270	460 → 580	Level settings
e.3	Voltage Hysteresis Threshold	6	12	VAC
e.4	Voltage Unbalance Detection (VUB)	2% → 10%	—	Level settings
e.5	Single Phasing (VSP)	IN VUB > 33%, OUT VUB < 28%	—	—
e.6	Rated Frequency	50 or 60 Hz	—	Level settings
e.7	Tolerance for Frequency Shift (FS)	2% → 10%	—	Level settings
e.8	Phase Reversal (PR)	Normal Phase Sequence A-B-C , Reversed Phase Sequence C-B-A	—	—
e.9	Trip Delay because of Phase Reversal (PR)	< 1 s	—	—
e.10	Trip Delay because of Another Voltage Failures (TD)	1 → 30 s	—	Level settings
e.11	Start Up Delay (TC)	0 → 600 s	—	Level settings
e.12	Trip Delay because of VSP	3 s	—	—
e.13	Start Mode	Auto/Manual	—	User selection
e.14	Minimum Time Between Two Start Up (According to Operation Current)	50 x Thermal Class 04 12.5 32 80 EXT (CT/5)	—	S
e.15	Nominal Current Setting	1.5 → 4 3.5 → 12.5 10 → 32 25 → 80 25% → 66% CT	—	A
e.16	Overload Level Setting (OL)	5% → 50%	—	Inom. Level settings
e.17	Thermal Class Setting	5 → 35	—	Level settings
e.18	Dynamic Setting of Motor Model (Cold Curve/Hot Curve)	Thermal class varies from 1 → 1/3 of adjusted class according to start up time and motor load level	—	IEC 60255-8
e.19	Maximun Time Between Cold/Hot Curve	2 Hours (from 1 to 1/3 or from 1/3 to 1)	—	IEC 60255-8-1990
e.20	Trip Delay because of Overload	According to Overload level and Adjusted Class	—	IEEE Std. C37.112-1996
e.21	Heat Threshold because of Overload Failure	100%	—	—
e.22	Current Unbalance (CUB)	CUB > 48%	—	—
e.23	Current Stall Phase (CSP)	CUB > 60%	—	—
e.24	Accelerated Locked Rotor Detection (LR)	YES/NO	—	User selection Heat setting to 100%
e.25	Trip delay because of CSP	1	—	S
e.26	Trip Delay because of CUB	2	—	S
e.27	High-Inertia Load Option	YES/NO	—	User selection.
e.28	High-Inertia Load Heat Threshold	400%	—	—
e.29	High-Inertia Load Start up Delay	20 → 120	—	s. Level settings
e.30	Thermal Machine Cooling Time	50 x Thermal Class	—	S
e.31	Undercurrent	YES/NO	—	—
e.32	Undercurrent Disconnection Type (UC)	% Inom / Power Factor (PF)	—	—
e.33	Undercurrent Adjusting (% Inom)	30% → 90%	—	Inom. Level settings
e.34	Undercurrent Adjusting (PF)	0.3 → 0.9	—	Level settings
e.35	Trip Delay because of UC	5 → 600	—	s. Level settings
e.36	Start Up Delay because of UC	2 → 500	—	Min. Level settings
e.37	Third Failure Detection	YES/NO	—	Level settings
e.38	Permanent disconnection because of Third Failure	3 Current failures in less than 105 min	—	IEEE Std C37.112-1996
e.39	Trip delay because of accelerated locked rotor	3	—	S

Events control characteristics			
e.39	Real Time Clock	hh:mm	mm/dd/yy
e.40	Load Control by Events (schedule)	YES/NO	User selection
e.41	Schedule Timer (events)	60	User selection
e.42	Schedule Timer (holidays)	20	User selection

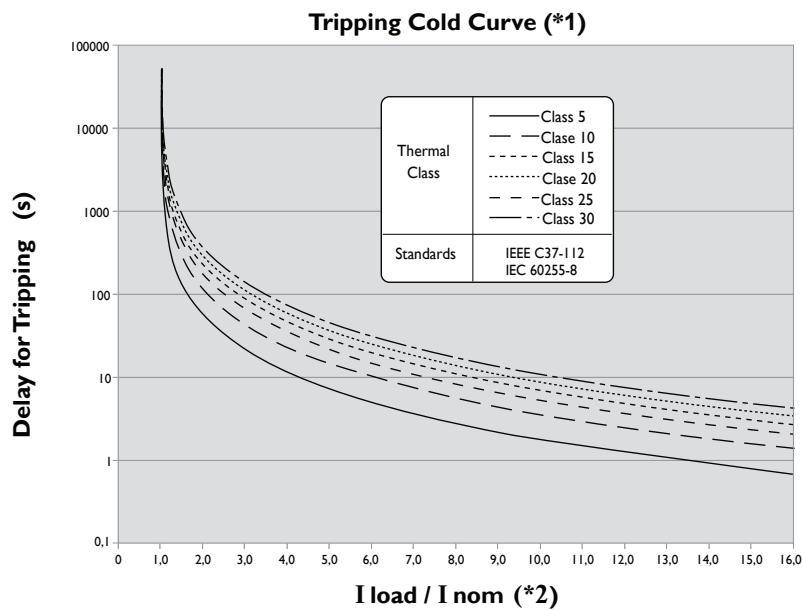
## F) Communications and Other Special Functions

f.1	Communication Protocol	MODBUS RTU @ 9600 8N1	See User Manual
f.2	Communication Ports	Port COM PORT (*)	See User Manual
f.3	Address Range	1 → 127	—
f.4	History Buffer Memory	20 last faults report (failure type, value, date, hour and time elapsed)	See User Manual
f.5	Parameters Block	0000 Free, 0001 → 9999 Blocked	User selection

(\*) Requires a separately sold adapter model COMPlug to convert the COMPort into RS485 modbus port.

## G) Immunity and Emissions, Electromagnetic Interference (EMC) for Heavy Industrial Environment (B)

g.1	Electrostatic Discharge	IEC 61000-4-2
g.2	Immunity to Ratio Frequency Test	IEC 61000-4-3
g.3	Electrical Fast Transients	IEC 61000-4-4
g.4	Surge Immunity Test	IEC 61000-4-5
g.5	Ratio-Frequency Continuous Conducted	IEC 61000-4-6
g.6	Power Frequency Magnetic Field	IEC 61000-4-8
g.7	Voltage Dips, Short Interruptions and Voltage Variations	IEC 61000-4-11
g.8	Harmonics and Interharmonics Immunity Tests	IEC 61000-4-13
g.9	Voltage Fluctuation Immunity	IEC 61000-4-14
g.10	Unbalance Immunity Test	IEC 61000-4-27
g.11	Variation of Power Frequency	IEC 61000-4-28

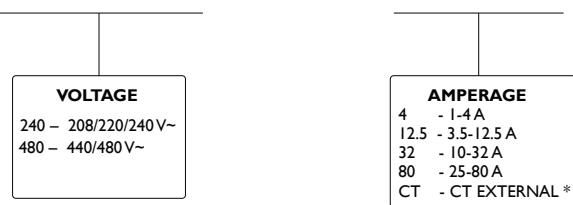


(\*1) Hot Curve = Cold Curve / 3

(\*2) I nom = Current value adjusted previously by the user

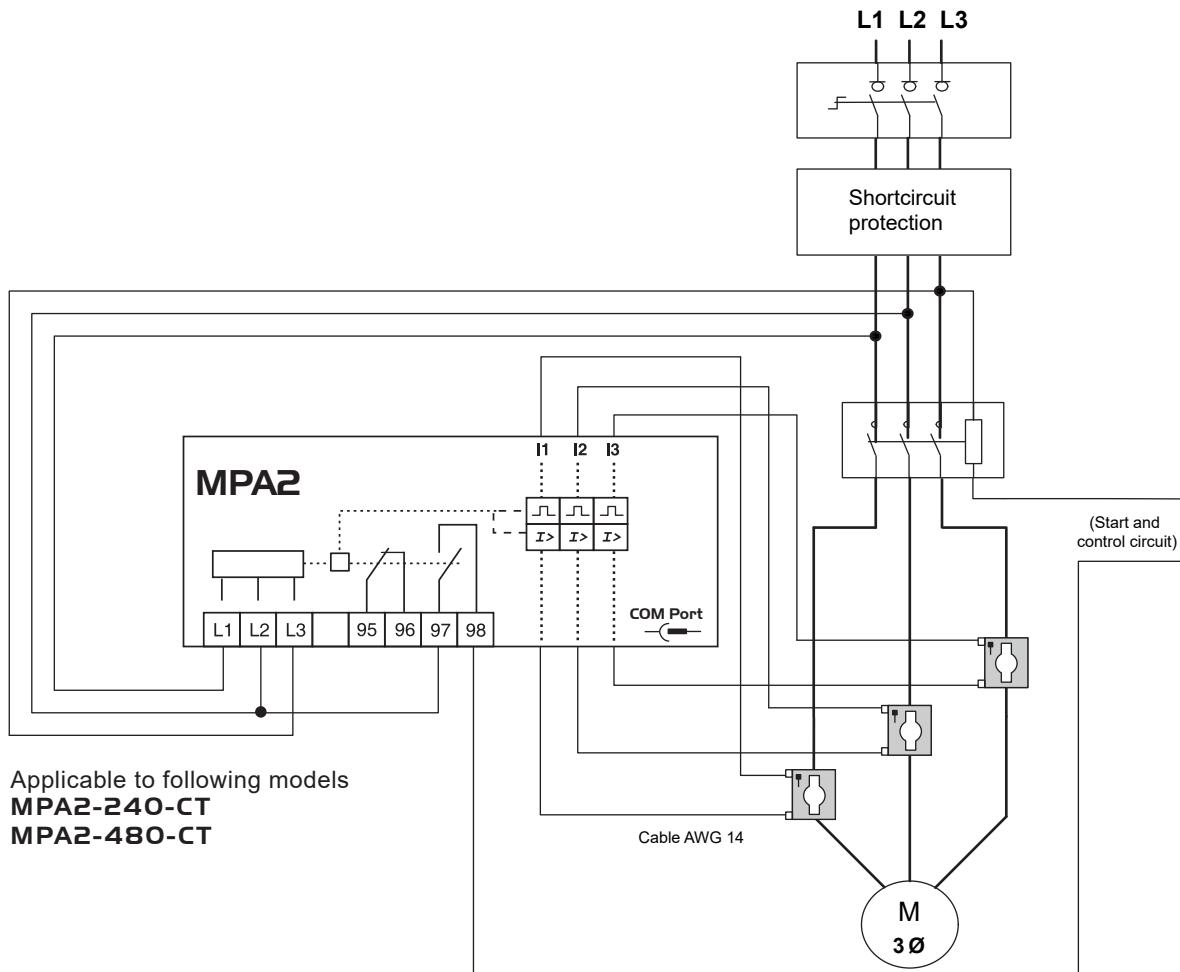
## ■ HOW TO ORDER ACCORDING TO CUSTOMER NEEDS

**MPA2**



NOTES: Technical data is valid at the time of printing. We reserve the right to subsequent alterations.

## 10 External toroids connection diagram



### \* NOTES:

- 1) Model identified as MPA2-240-CT and MPA2-480-CT is exclusively used with external CTs. This model protects motors with rated current up to 660 A. The CTs are not included.
- 2) User must specify motor rated current. With this data select a Nominal current range accordingly to adjacent table, getting then /5 relationship required external CTs to install.
- 3) Then user must program with external CT adding the adjustment instructions contained in this application.
- 4) Calibration is kept guaranteed as long as external CTs are Commercial Class I Secondary 5A.

### Suggested external CTs according to nominal current

Nominal current range		Toroid
Min	Max	Ratio /5
13	17	50
15	20	60
19	25	75
25	33	100
31	42	125
38	50	150
50	67	200
63	83	250
75	100	300
100	133	400
125	167	500
150	200	600
190	250	750
200	260	800
250	330	1000
300	350A	1200
375	500	1500
500	660	2000

Example: if a motor consume a nominal current of 350 amperes, the external toroids to select will be a value of 1200/5.

## II Adjusting external CTs and Nominal current

Press both **ADJUSTMENT** pushbuttons from main screen

VL1L2 VL2L3 VL3L1 VUB  
220 220 220 7%  
2 2 2 0%  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

Press one **ADJUSTMENT** pushbutton to get to **CURRENT ADJUST**

VL1L2 VL2L3 VL3L1 VUB  
VOLTAGE ADJUST  
CURRENT ADJUST  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

On **CURRENT ADJUST** press **SELECT** pushbutton

VL1L2 VL2L3 VL3L1 VUB  
CURRENT ADJUST  
TIME ADJUST  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

On **CT** press **SELECT** pushbutton

VL1L2 VL2L3 VL3L1 VUB  
CT 800/5  
I NOMINAL 200A  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

On **CT** press one **ADJUSTMENT** pushbutton to get to desired ratio (see **Suggested external CTs accordingly to nominal current table**).

Eg.: For motor with nominal current FLA = 350A, change ratio to 1200/5 then press pushbutton **SELECT**.

VL1L2 VL2L3 VL3L1 VUB  
CT 1200/5  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

REARM ADJUSTMENT SELECT

Press both **ADJUSTMENT** pushbuttons to get to **I NOMINAL**.

VL1L2 VL2L3 VL3L1 VUB  
CT 1200/5  
I NOMINAL -300A-  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

VL1L2 VL2L3 VL3L1 VUB  
I NOMINAL -300A-  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

On **I NOMINAL** press **SELECT**

VL1L2 VL2L3 VL3L1 VUB  
I NOMINAL -350A-  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

Press one **ADJUSTMENT** pushbutton to get to desired value..

e.g. change 300 to 350A

VL1L2 VL2L3 VL3L1 VUB  
I NOMINAL -350A-  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

Adjust desired value pressing pushbutton **SELECT**

VL1L2 VL2L3 VL3L1 VUB  
CT 1200/5  
I NOMINAL 350A  
I1 I2 I3 CUB

REARM ADJUSTMENT SELECT

Back to **CURRENT MENU**

REARM ADJUSTMENT SELECT

Follow with other current adjustus or back to main menu

# MPA2

## MODBUS REGISTER MAPPING

GROUP	REGISTER ADDRESS	NAME	READ/ WRITE	MIN	MAX	SIZE	UNITS	DESCRIPTION / FORMAT	FACTORY SETTING
PRODUCT ID	00000	PRODUCT_ID	R	12	12			F0	13
	00001	MODEL	R	162	252	1			
	00002	VERSION	R	0	255	1		F2	
	00003	MODBUS_ADDRESS	R/W	1	127	1		F3	1
	00004	RESTORE SYSTEM	R/W	0	1	1		F7	
	00005	ACCESS_PASSWORD	R/W	0	65535	1		F4	0
SECURITY	00006	SERIAL_L	R	0	65535	1			
CALIBRATION	00008								
	00010								
	00012								
	00014	WARNING: THESE REGISTERS SHOULD NOT BE MODIFIED BY THE USER							
	00016								
	00018								
	00020								
	00032	ADDRESS ARE RESERVED.							
ADJUSTMENTS	00033	(UV) UNDER VOLTAGE SETTING	R/W	350	460	1	VAC	F35	432
	00034	(OV) OVER VOLTAGE SETTING	R/W	469	580	1	VAC	F20	560
	00035	(VUB) VOLTAGE UNBALANCE SETTING	R/W	2	10	1	%	F7	6
	00036	(AC) POWER FREQUENCY SETTING	R/W	0	1	1		F42	1
	00037	(FS) FREQUENCY SHIFT SETTING	R/W	2	10	1	%	F7	2
	00038	(TD) TRIP DELAY SETTING	R/W	1	30	1	Sec	F7	10
	00039	(TC) STAR UP DELAY SETTING	R/W	0	600	1	Sec	F7	60
	00040	ADDRESSES ARE RESERVERD.							
	00064	ADDRESSES ARE RESERVERD.							
	00065	(FLA) NOMINAL CURRENT SETTING	R/W	15	180	1	AMP	F39	
	00066	MOTOR THERMAL CLASS SETTING	R/W	5	30				
	00067	(OL) OVERLOAD LEVEL SETTING	R/W	5	50				
	00068	UNDERCURRENT DETECTION	R/W	0	1				
	00069	HIGH-INERTIA LOAD DETECTION	R/W	0	1				
	00070	(LR) ACCEL. LOCKED ROTOR DETECTION	R/W	0	1				
	00071	(3F) THIRTD FAILURE DETECTION	R/W	0	1				
	00072	ADDRESSES ARE RESERVERD.							
	00073	UNDERCURRENT TYPE SETTING	R/W	0	1	1		F52	0
PRODUCT ID	00074	TRIP DELAY BECAUSE OF UC	R/W	5	600	1	Sec	F7	50
	00075	START UP DELAY AFTER UC	R/W	2	500	1	Min	F7	5
	00076	ADDRESSES ARE RESERVED.							
	00077	(PF) UNDERCURRENT PF	R/W	3	9	1	PF/10	F7	5
	00078	(IN) UNDERCURRENT IN	R/W	30	90	1	%	F7	80
	00079	TRIP DELAY BECAUSE OF LOCKED ROTOR	R/W	20	120	1	Sec	F7	20
CLOCK	00128	MINUTE	R/W	0	59	1	Min	F7	
	00129	HOUR	R/W	0	23	1	Hours	F7	
	00130	DAY WEEK	R	1	7	1		F41	
	00131	DAY	R/W	1	31	1	Day	F7	
	00132	MONTH	R/W	1	12	1	Month	F7	
	00133	YEAR	R/W	0	45	1	Year	F7	
STATUS	00160	FAULT	R	0				F18	
	00161	(TC) STAR UP DELAY	R	0	30000	1	Sec	F7	
	00162	RELAY	R	0	1	1		F7	
	00163	START MODE	R/W	0	1	1		F19	0
	00164	CONTROL_ON_OFF	R/W	0	6	1		F10	
	00165	TOTAL NUMBER OF STARTS	R/W	0	65535	1		F7	1
	00166	NUMBER OF STARTS MANUAL	R/W	0	65535	1		F42	
MEASUREMENT	00192	FREQUENCY	R	400	700	1	Hz 10	F7	
	00193	PERIOD	R	14280	25000	1	uSec	F7	
	00194	VL1L2	R	0		1	VAC	F7	
	00195	VL2L3	R	0		1	VAC		
	00196	VL3L1	R	0		1	VAC		
	00197	V AVERAGE	R	0		1	VAC	F7	
	00198	IA	R	0		1	AMP/100	F7	
	00199	IB	R	0		1	AMP/100	F7	
	00200	IC	R	0		1	AMP/100	F7	
	00201	I AVERAGE	R	0		1	AMP/100	F7	
	00202	(PF) POWER FACTOR	R	0	100	1	FP/100	F7	
	00203	TEMPERATURE CAPACITY	R	0	65535	1	%	F7	
	00204	REAL POWER (kW)	R	0	9999	1		F45	0
	00205	REACTIVE POWER (kVA)	R	0	9999	1		F45	0

## MPA2

### MODBUS REGISTER MAPPING

GROUP	REGISTER ADDRESS	NAME	READ/ WRITE	MIN	MAX	SIZE	UNITS	DESCRIPTION / FORMAT	FACTORY SETTING
MEASUREMENTS	00206	TOTAL_ENERGY_L	R	0	99999999	1	10xW/H	F8	0
	00208	TOTAL_HOURS_L	R	0	59999940	1	Min	F8	0
	00210	THERMAL_CAPACITY_L	R			1		F5	
	00213	DYNAMIC_CLASS	R	6	20	1		F7	
PRODUCT ADJUSTMENT	01536	TIME_CONTROL	R/W	0	1	1		F7	0
	1537-2017	EVENT 01/60 - 60/60	R/W	0				F48	
	3072-3152	HOLIDAY 01/20 - 20/20	R/W	0				F49	
HYSTORICAL	04096	NUMBER_TOTAL_FAILS	R/W	0	20	1		F7	0
	04097	POINTER_FAILS	R	0	19	1		F7	
	4098-4418	FAILS 01/20 - 20/20	R	0				F50	

## MPA2

### DATA FORMAT

CODE	TYPE	DESCRIPTION
F0	8 bits	PRODUCT ID
	13	MPA2
F2	8 bits	SOFTWARE VERSION
	bits 4...0	Software Version - Minor Number(0 a 31)
	bits 7...5	Software Version - Major Number (0 a 7)
		VERSION= 0x20   0x04 = 0x24
F3	16 bits	MODBUS ADDRESS
	byte 0	Address (1 a 127)
	byte 1	null. not used
F4	16 bits	Unsigned int - WRITE PROTECTION INDICATOR
		<i>Adjustments</i>   <i>Calibration</i>
	0x0000	Unprotected   Protected
	0x0001	Protected   Protected
	0xFFFF	Protected   Unprotected
	0x0002 a 0xFFFFE	Encrypted Password Code - Adjustments and Calibration Protected
F5	32 bits	Float 24 bits
	0xNNNNNN00	Float 24 bits
		<i>Example: Value1 = 1,023 = 0x003F82F1</i>
F7	16 bits	Unsigned int
F8	32 bits	Unsigned Long
F10	16 bits	ADJUSTMENT - CONTROL ON/OFF
	MPA2	
	0	ON
	1	OFF - FAILURE MODE
	2	OFF - TRIP DELAY BECAUSE OF VOLTAGE FAILURES
	3	OFF - MODBUS
	4	OFF - MANUAL MODE
	5	OFF - 3RD FAILURE
	6	OFF - SCHEDULER TIMER
	7	OFF - TRIP DELAY BECAUSE OF CURRENT FAILURES
	8	OFF - TRIP DELAY BECAUSE OF (UC)
F18	16 bits	FAULT REGISTER
	0	No Fail
	bit 0	Fail - FS - Frequency Shift
	bit 1	Fail - PR - Phase Reversal
	bit 2	Fail - VSP - Voltage Single Unbalance
	bit 3	Fail - VUB - Voltage Unbalance
	bit 4	Fail - UV - Undervoltage
	bit 5	Fail - OV - Overvoltage
	bit 6	Fail - RL - Locked Rotor
	bit 7	Fail - PF - Power Factor
	bit 8	Fail - CUB - Current Unbalance
	bit 9	Fail - UC - Undercurrent
	bit 10	Fail - OL - Overload
	bit 11	Fail - CSP - Current Single Phase

# MPA2

## DATA FORMAT

CODE	TYPE	DESCRIPTION
F19	1 bits	START MODE
	0	MANUAL
	1	AUTO
F35	16 bits	Unsigned int - UNDER VOLTAGE SETTING - UV
	Valor	Factory Setting = 187V - Min = 165V - Max = 225V @ model = 240 - 208/220/240V
		Factory Setting = 432V - Min = 350V - Max = 460V @ model = 480 - 440/480V
F36	16 bits	Unsigned int - OVER VOLTAGE SETTING - OV
	Valor	Factory Setting = 229V - Min = 215V - Max = 276V @ model = 240V - 208/220/240V
		Factory Setting = 528V - Min = 460V - Max = 580V @ model = 480V - 440/480V
F39	16 bits	Unsigned int - NOMINAL CURRENT SETTING
	Valor	Factory Setting = 2A - Min = 1.5A - Max = 4A @ model = 4A
		Factory Setting = 4,5A - Min = 3,5A - Max = 12,5A @ model = 12,5A
		Factory Setting = 20A - Min = 25A - Max = 80A @ model = 32A
		Factory Setting = 40A - Min = 10A - Max = 32A @ model = 80A
		Factory Setting = 31A - Min = 31A - Max = 42A - Model CT = 125/5 @ model = CTs EXT
F41	16 bits	DAY OF THE WEEK
	1	MONDAY
	2	TUESDAY
	3	WEDNESDAY
	4	THURSDAY
	5	FRIDAY
	6	SATURDAY
	7	SUNDAY
F45	16 bits	Unsigned int - VALUE OF REAL POWER (kW) AND REACTIVE POWER (kVA)
	Value	Real Power W = Value * 10W @ model = 4A, 12.5A, 32A, 80A
		Real Power W = Value * 100W @ model = CTs EXT
		Reactive Power VA = Value * 10VA @ model = 4A, 12.5A, 32A, 80A
		Reactive Power VA = Value * 100VA @ model = CTs EXT
F48	16 bits	EVENT - Indicate how "Events" are stored
		<i>Note: Each "event" configuration occupies 8 registers in modbus</i>
		<b>Weekday</b>
		Unsigned Int 0
		Bit 0 - MONDAY
		Bit 1 - TUESDAY
		Bit 2 - WEDNESDAY
		Bit 3 - THURSDAY
		Bit 4 - FRIDAY
		Bit 5 - SATURDAY
		Bit 6 - SUNDAY
		Bit 7 - HOLIDAY
	Unsigned Int 1	ON Hour - 0 to 23 - Hour to start the event
	Unsigned Int 2	ON Minute - 0 to 59 - Minute to start the event
	Unsigned Int 3	OFF Hour - 0 to 23 - Hour to stop the event
	Unsigned Int 4	OFF Minute - 0 to 59 - Minute to stop the event
F49	16 bits	HOLIDAY - Indicate how "Holiday" are stored
		<i>Note: Each "event" configuration occupies 8 registers in modbus</i>
	Unsigned Int 0	Month
	Unsigned Int 1	Day
F50	16 bits	Setting YES / NO
	0	NO
	1	YES



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