Protect IT – MNS Motor Management INSUM®

MPU - Multi Purpose Unit

- Catalogue -

INSUM®
Multi Purpose Unit

Revision 1.6

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General description

The INSUM® MPU (Multi Purpose Unit) includes the Auto-Restart-Relay function to automatically restart motors after a voltage interruption of the mains power supply which is sometimes necessary due to different process reasons.

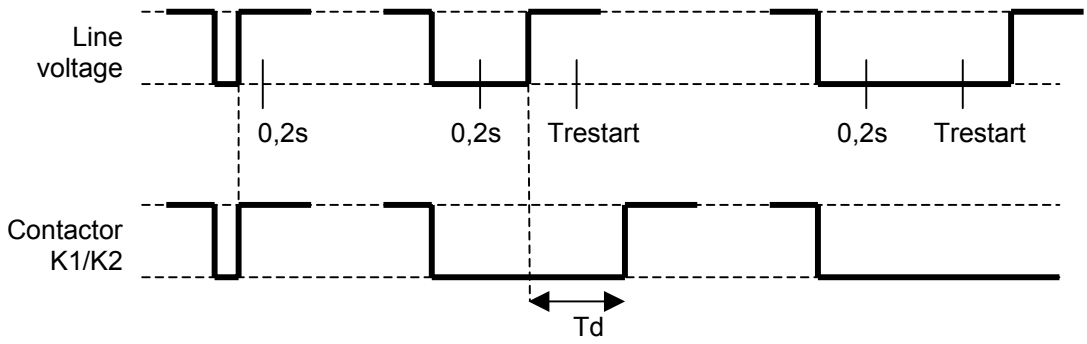
The MPU is part of the INSUM® system and can be used together with INSUM® Motor Control Unit (MCU) or as Stand-Alone-Device.

The MPU is measuring the duration of the voltage dip and reacts depending on this measured time, i.e. perform an immediate automatic restart, a delayed restart or no automatic restart if the time was too long.

There are two different modes of restart-function available :

1. **ERM - Mode**

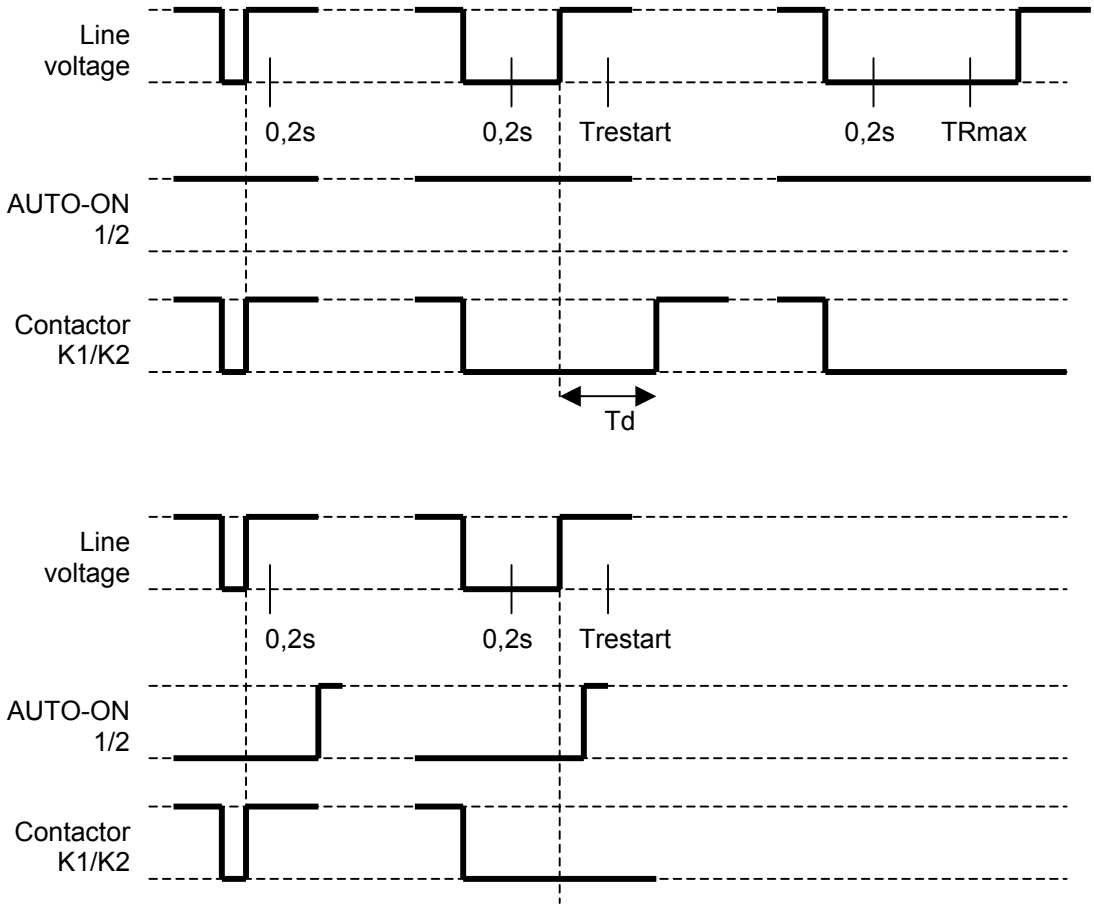
   The MPU is performing the automatic restart of a motor after a voltage dip depending on the duration.



Trestart :max. restart time
Td : staggered start delay time

2. TDRM - Mode

The MPU is performing the automatic restart of a motor after a voltage dip depending on the duration, but only if the input “Auto-ON” is activated.



Both functions ERM / TDRM are independend from each other. The function can be selected by a selector switch.

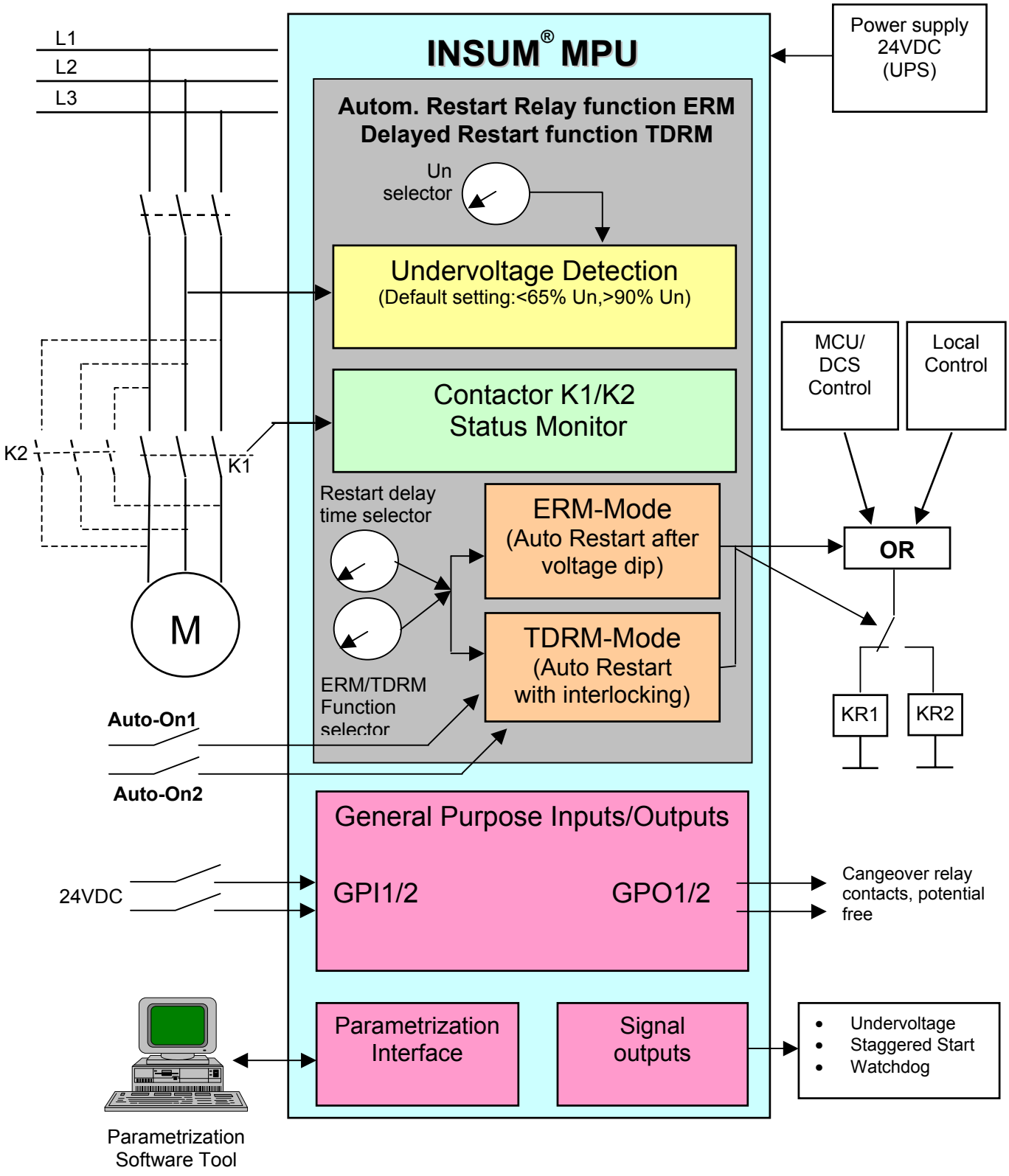
The MPU device is supporting two motor starter types :

- NR-DOL/RCU (Non Reversing Direct Online Starter, RCU)
- Rev-DOL/RCU (Reversing Direct Online Starter, RCU)

The MPU automatically detects the activated contactor and starts the motor in that rotation direction the motor was spinning before the voltage dip occurred.

Additionally the MPU device has two General Purpose Inputs (GPI1/2) and two dedicated potential free relay outputs (GPO1/2).

Functional schematic

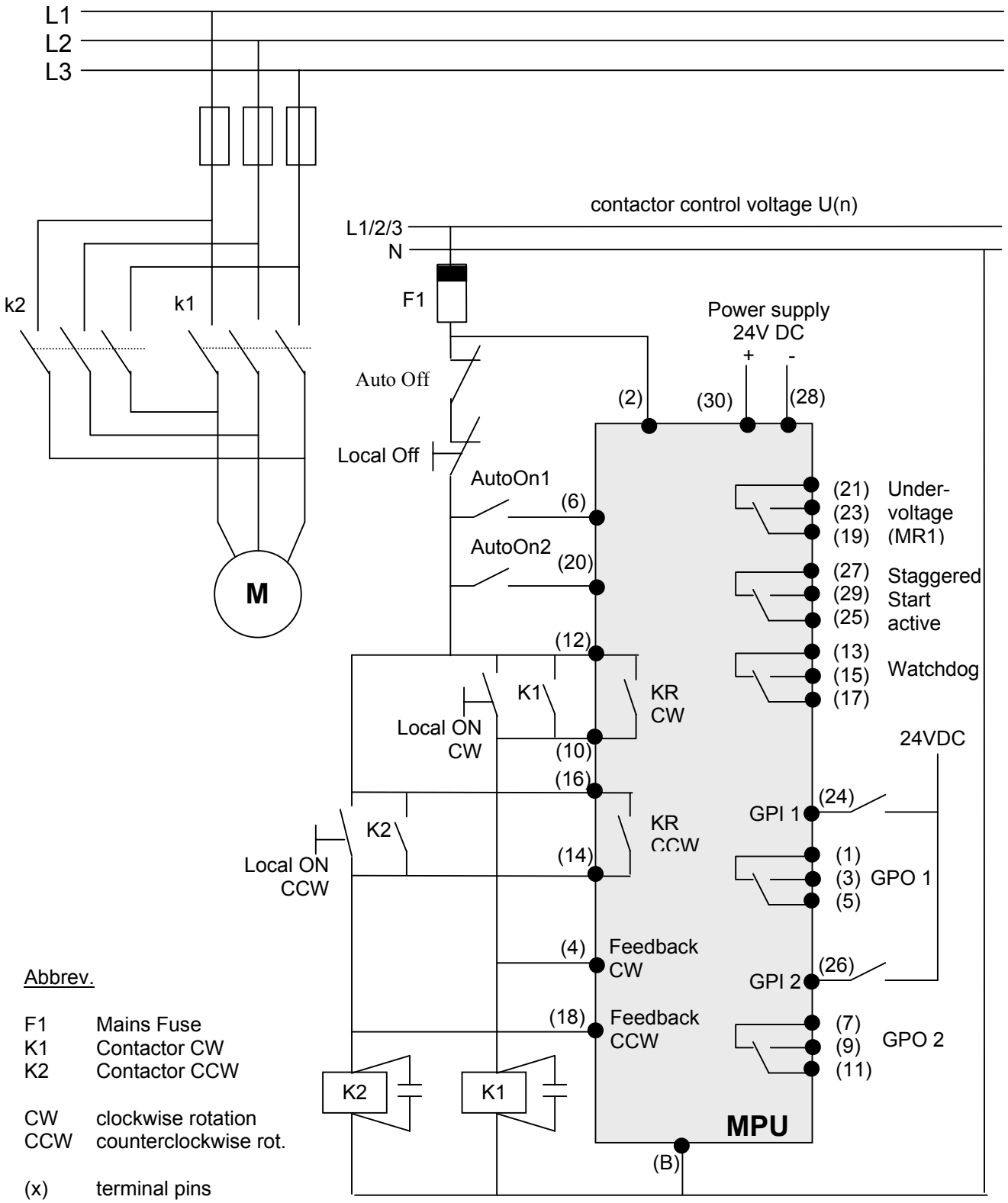


Features

- Microprocessor based Automatic Restart Relay
- Automatic restart function ERM-mode
- Automatic restart function TDRM-mode with interlocking (Auto-ON)
- Supports DOL/RCU and REV-DOL/RCU starter types
- Min. voltage dip detection time of 8ms
- Phase voltage measuring ratio (Phase-N) adjustable from 110V – 277V AC/DC
- Undervoltage detection-level adjustable by software tool (default = 65% x Un)
- Voltage restoration level adjustable by software tool (default = 90% x Un)
- Max. voltage dip time for automatic restart adjustable from 1-120s
- Staggered start delay time adjustable from 1-1200s
- “Double-Dip”-function (2 voltage dips within 1s) supported
- Easy parametrization by selector switches or programming interface (PC)
- Two additional electrical isolated General Purpose Inputs (GPI) 24VDC and 2 dedicated General Purpose Output relays (GPO)

Wiring schematic

Example REV-DOL/RCU



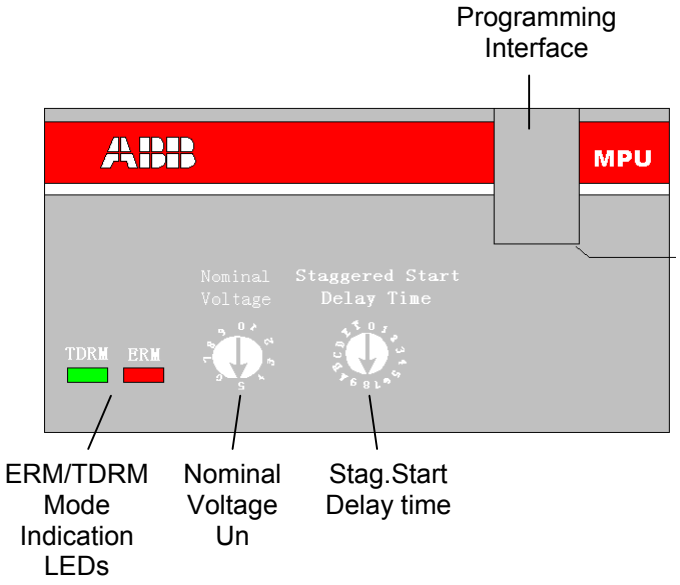
Abbrev.

F1	Mains Fuse
K1	Contactor CW
K2	Contactor CCW
CW	clockwise rotation
CCW	counterclockwise rot.
(x)	terminal pins

Terminal description

Description	MPU Terminals		Description
Output General Purpose GPO1 Relay common	1	***2***	Voltage Monitor In (Phase)
Output General Purpose GPO1 Relay opening contact	3	***4***	Contactor Coil Voltage (CW = K1) = Feedback CW
Output General Purpose GPO1 Relay closing contact	5	***6***	Auto ON 1
Output General Purpose GPO2 Relay common	7	***B***	Voltage Monitor Neutral
Output General Purpose GPO2 Relay opening contact	9	***10***	Contactor Control Relay Output (CW)
Output General Purpose GPO2 Relay closing contact	11	***12***	Contactor Control Relay Output (CW)
Output *"Watchdog"* Relay common	13	14	Contactor Control Relay Output (CCW)
Output *"Watchdog"* Relay opening contact	15	16	Contactor Control Relay Output (CCW)
Output *"Watchdog"* Relay closing contact	17	18	Contactor Coil Voltage (CCW = K2) = Feedback CCW
Signal Output *"Undervoltage"* (MR1) Relay closing contact	19	20	Auto ON 2
Signal Output *"Undervoltage"* (MR1) Relay common	21	22	NC
Signal Output "*Undervoltage"* (MR1) Relay opening contact	23	24	General Purpose Input GPI 1 (24VDC)
Signal Output *"Staggered Start active"* Relay closing contact	25	26	General Purpose Input GPI 2 (24VDC)
Signal Output *"Staggered Start active"* Relay common	27	28	Power Supply -24V DC
Signal Output *"Staggered Start active"* Relay opening contact	29	30	Power Supply +24V DC

Indication LEDs and Selector switches



Nominal Voltage Un	
Switch Pos.	**Voltage (Ph-N)**
1	110V
2	220V
3	230V
4	240V
5	255V
6	270V
7-9	reserved

Staggered Start Delay Time	
Switch Pos.	**delay time**
1	1s
2	2s
3	5s
4	10s
5	15s
6	20s
7	25s
8	30s
9	35s
A	40s
B	45s
C	50s
D	55s
E	60s
F	1-120s (setting via software)

Technical Details and Dimensions

General electrical data

Auxiliary supply voltage	
Rated operational voltage (Ue)	24VDC
Voltage operation range / current	+20 ... +36VDC
Current consumption MPU	80mA (typ.) / 24VDC

Max. ratings for contactor control relay KR CW / KR CCW and Watchdog / GPO1 / GPO2 relais (change over contacts)	
Max. switching voltage	380V AC
Max. switching current	8A AC
Max. continuous current	2A (DC-13) or 2A (AC-15)
Max. switching capacity	2000 VA

Feedback signals CW,CCW	
Number of analog input	2
Max. input voltage	300V

General Purpose Input signals GPI1/2	
Rated input voltage	24V DC
Input current, max.	10 mA

Digital relay output "Undervoltage", "Staggered Start" (change over contacts)	
Number of digital output	2
Rated operational current	0,5A
Rated operational voltage	24VDC / 230VAC

Voltage measurement Phase-N	**(= Phase-Phase)**	Un selector switch pos.
110V AC/DC	(=190V AC)	1
220V AC/DC	(=380V AC)	2
230V AC/DC	(=400V AC)	3
240V AC/DC	(=415V AC)	4
255V AC/DC	(=440V AC)	5
277V AC/DC	(=480V AC)	6

Environmental and mechanical data

Mounting	on DIN rail (EN 50022-35) or with 4 screws M3
Dimensions (W x H x D)	110 x 105 x 65 mm (W x H x D)
Net weight	400g
Degree of protection	IP20
Storage temperature range	-25 … +85 ^{o}C
Operating temperature range	-5 … +55 ^{o}C
Approvals	CE

Restart Function data

Undervoltage Detection Level (UDL)	0..99% x Un via software setting default setting: 65% x Un
Voltage Restoration Level (VRL)	0..100% x Un via software setting default setting : 90% x Un
Permissible residual coil voltage at : • switched-off contactor K1 / K2, Auto-On1/2 • switched-on contactor K1 / K2, Auto-On1/2	< 0,3 x Un > 0,6 x Un
Min. detectable duration of voltage level	8 ms
Fast restart delay time	≤ 30ms
Max. duration of voltage dip for delayed restart (Trestart)	Selectable by software : Range: 1s – 120s Steps: 1s Default: 4s
Duration of restart puls (relay KR CW/CCW)	1s

Staggered start delay time (U > mains voltage return level VRL,e.g. 90%)	**Time**	**selector switch pos.**
	1s	1
	2s	2
	5s	3
	10s	4
	15s	5
	20s	6
	25s	7
	30s	8
	35s	9
	40s	A
	45s	B
	50s	C
	55s	D
	60s	E
	software settings	F (Auto)

Ordering data

INSUM® MPU Kit	Order code 1TGL 920000R2001	Incl. MPU Main Unit and MPU Baseplate
INSUM® MPU Baseplate kit	Order code 1TGL920000R3001	Incl. MPU Cover and MPU Baseplate
MPU Main Unit	Order code 1TGL920000R0001	
MPU Download cable	Order code 1TGL920000R5001	For Parametrization

Further documentation

INSUM® MPU User's Guide	1TGC 901011M0205
INSUM® MPU Installation Sheet English/Chinese	1TGC 901013M2901

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