EM4000
(FTI06006)

Hardware Installation Manual

Publication type:	Hardware Installation Manual
Publication number:	FTI06006
Title:	EM4000
Subject:	
Issue:	1.0
Publication date:	03 May 2010
Total number of pages:	16

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References

ELEQ website:
http://www.eleq.com/ENG/Home/index.php

ELEQ Installation Manual:
http://www.eleq.com/lmbinaries/installation_manual_em4000_rev_2_8.pdf

Introduction

The Hardware Installation Manual provides instructions for installing and monitoring the measuring transducer as used within FT NavVision®. The chapters and sections are organized in chronological order in which the specific components must be installed and monitored (where applicable).

NOTE

This section provides only a summary of the most important safety requirements and notes, which will be mentioned in the individual sections. To protect your health and prevent damage to the devices, it is essential to read and carefully follow the safety instructions.

About the installation manual

The installation manual contains the following chapters:

- Chapter “Safety instructions” presents warning, caution and note information, which the user should pay attention to.
- Chapter “System configuration” gives an overview of the transducer.
- Chapter “Receiving, unpacking and checking” contains instructions on how to receive, unpack or check the transducer.
- Chapter “Installation and mounting” contains instructions on how to install and/or mount the transducer.
- Chapter “Technical specifications” contains an overview of the main features and technical data.

Abbreviations list

AC	Alternating Current
DC	Direct Current
DIN	Deutsches Institut für Normung
EMC	Electromagnetic Compatibility
EN	Europese Norm
ESD	Electrostatic Discharge
GND	Ground
IEC	International Electrotechnical Commission
IP	Ingress Protection / Internet Protocol
LED	Light Emitting Diode
NPN	Not Pointing in, Not pointing No (transistor type)
Rx	Receive Data
SRAM	Static Random Access Memory
TCP	Transmission Control Protocol
Tx	Transmit Data
Un	Nominal Voltage

Safety instructions

The indications NOTE, CAUTION and WARNING have the following significance:

NOTE

An operating procedure, practice or condition etc., which it is essential to emphasize.

CAUTION

An operating procedure, practise or condition etc., which, if not strictly observed, may damage or destroy equipment.

WARNING

An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or loss of life.

1. Receiving, unpacking and checking

1.1 Procedure

1. Remove the transport casing

2. Visually inspect the respective parts

3. Check that all items are included in accordance with the delivery documents.

4. Check for transport damages.
   In case of transport damage appropriate action must be taken against the latest carrier and the nearest certified dealer or representative should be informed.

5. Store the part in the original transport package in a dry and dust free place, if the unit is not to be installed immediately. Observe the environmental requirements stated in the specifications

NOTE
Notify your sales representative if any of the above items is missing or damaged.

2. Installation and mounting

2.1 Overview

The FAGET EM4000 is a universally applicable measuring transducer, suitable for accurate measurement of voltage and current in low and medium voltage systems. The transducer is suitable for 1 or 3 phase systems, with or without a zero conductor.
During operation the green “RUN” indication LED will blink (see Figure 2-1), which indicates that the transducer is activated. Due to the initialization process of the transducer after power up, it may take a few seconds before the “RUN” indication LED is starting to blink.

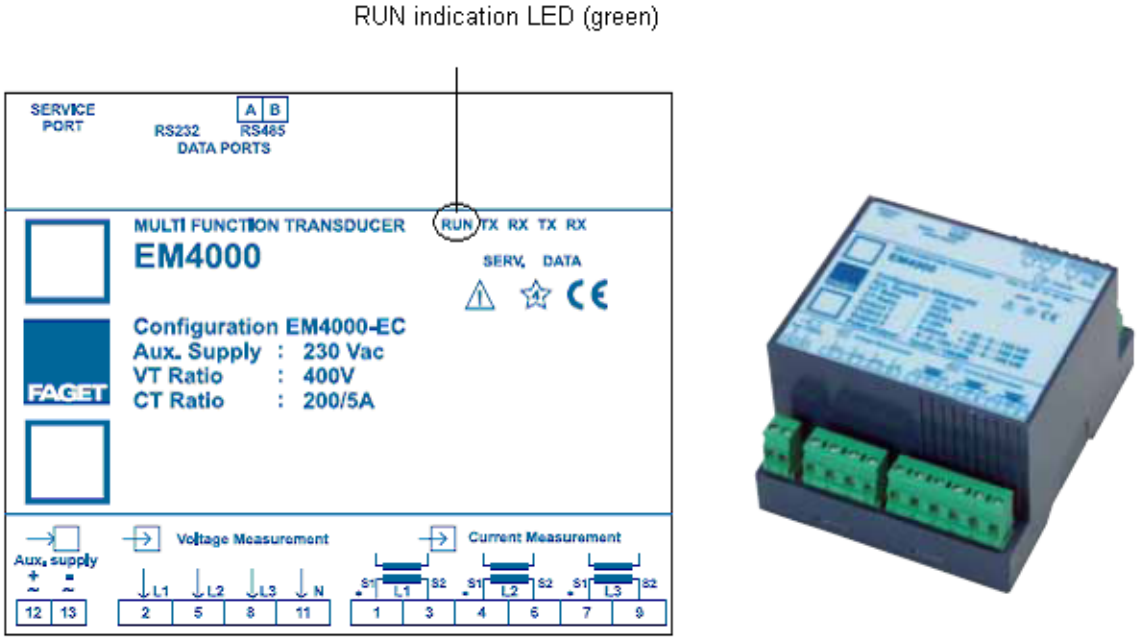

Figure 2-1: Wiring diagram (typical)

The wiring diagram is placed at the side of the transducer. This indicates how to connect the multifunction transducer (EM4000-EC). All relevant information is indicated on the rating plate of the transducer, including the configuration data. The rating plate gives all necessary information about the configuration of the transducer.

2.2 Software version label

The label placed on the rear side refers to the software version (see Figure 2-2).

Figure 2-2: Software version label (typical)

For more information concerning current, voltage and power or phase angle measurement, please refer to the manufacturer's installation manual (see References).

2.3 Hardware installation procedure

2.3.1 Safety instructions

WARNING

- **Only qualified personnel must carry out installation and startup**
- **Make sure that all cables are not live when making the connections**
- **The multifunction transducer operates with voltages that can be lethal**
- **Do not place a fuse in the secondary current circuits of the external current transformers (this fuse can only be replaced by the manufacturer).**

The EM4000 is designed for mounting on a 35 mm DIN-rail. The wires can be connected to the standard screw able plug connectors (cage clamp is optional).
Make sure that there is a minimum 5 cm between the top and bottom of the transducer and other equipment.

During mounting of the transducer, no extra precautions have to be taken against Electrostatic Discharge (ESD), the transducer is well protected against it.
It is not necessary to protect the measurement voltage inputs. However, if you want to protect these inputs, use a 2 A fuse. The auxiliary supply is already protected internally by a 2 A fuse.

2.4 Dimensions

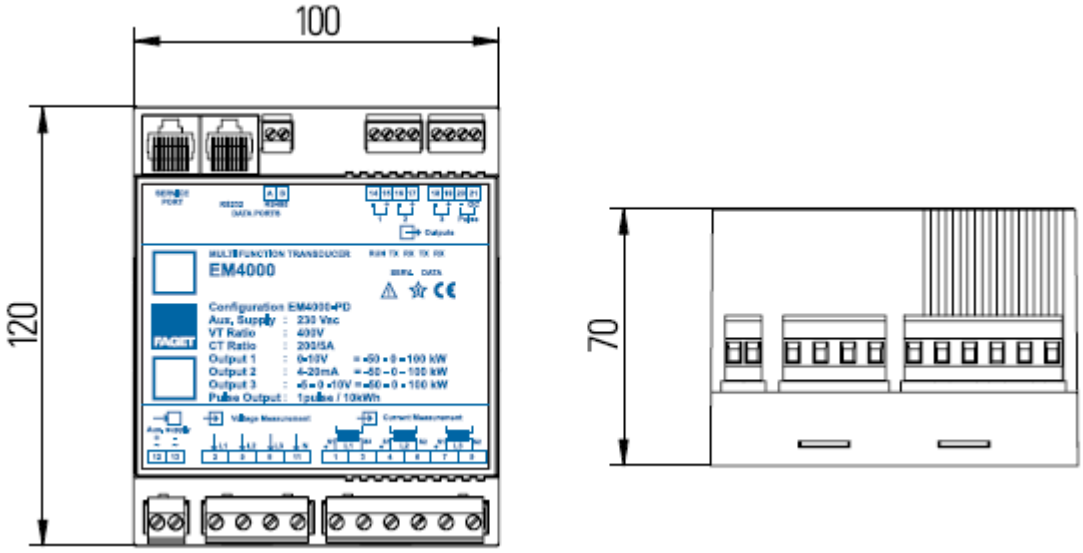

Figure 2-3: Dimensions (in mm)

3. Technical specifications

Input	
Current voltage	
Nominal voltage (Un)	58/100 V …….. 400/690 VAC
Crest factor	2
Overload	1,2 x Un continuous 1000 V / 10 s
Power consumption	< 2 mA (for each voltage input)
Input impedance	> 1 MΩ per phase
Circuit current	
Nominal current (In)	1 or 5 ampere
Crest factor	3
Overload	1,2 x In continuous 180 A / 1 s
Power consumption	< 0,3 VA (for each current input)
Frequency of current and circuit voltage	
Standard reach	45 – 65 Hz
Special	$16^{2/3}$ Hz 400 Hz

Table 3-1: Input

Circuit output	
Current output DC	
Current / load	4 – 20 mA / < 500 Ω
(Io / Ro)	-2,5 – 0 – 2,5 mA / < 4 kΩ -5 – 0 – 5 mA / < 2 kΩ -10 – 0 – 10 mA / < 1 kΩ -20 - 0 – 20 mA / < 500 Ω
Compliance voltage	10 V
Live zero	20% of end value
Ripple	< 0,1% p-p
Max. current	At Ro = max. = 1,5 xIo At Ro = 0 Ω = < +25 mA
Voltage output DC	
Voltage / load	0 – 10 V / > 1 kΩ
(Uo / Ro)	-5 – 0 – 5 V / > 500 Ω -10 – 0 – 10 V / 1 kΩ
Ripple	< 0,1% p-p
Max. voltage	< ±15 V
Max. current	10 mA max.
Response time (input step response)	
Analogue	< 125 ms
Digital	< 100 ms

Output curves	Single, dual and triple slope
Pulse output	
Pulse output	Open collector (NPN)
Pulse width	50 …….. 1000 ms
Pulse frequency	10 Hz max.
Max. current	50 mA (sink)
Max. voltage	30 VDC
Accuracy class	
Analogue outputs	
(1, 2 and 3)	0.5 (IEC60688) 1 (IEC62052)

Table 3-2: Circuit output

Auxiliary voltage	
AC voltage	
Standard (± 10%)	85 …….. 240 VAC
Special	400, 440 VAC
Range	45 – 65 Hz
DC voltage	
Standard (±10%)	24 – 65 VDC
Special	100 – 330 VDC
Power consumption	< 5 ……8 VA[1]

Table 3-3: Auxiliary voltage

Temperature range	
Reference temp. (Tn)	23°C
Ambient temp. (Tw)	-10°C – +60°C
Storage temp. (To)	-25°C – +70°C

Table 3-4: Temperature range

[1] Depending on the number of analogue outputs

Safety and security	
Variation in auxiliary voltage	
(± 10%)	No influence
Pollution class	II (IEC60947-1)
Application class	III (I60688)
EMC	
Emission	EN50081-1
Immunity	EN50082-2
Impulse test	5 kV 1,2 / 50 µs 0,5 Ws (IEC60688)
Insulation	4 kV / 1 min. at 50 Hz (IEC61010)

Table 3-5: Safety and security

Housing	
Material	PC
Dimensions (L x B x H)	120 x 100 x 70 mm
Mounting	DIN rail
Protection class: Housing Connecting clamps	 IP40 IP20
Weight	± 0,8 kg (aux. supply 400 & 440 VAC) ± 0,5 kg (all others)

Table 3-6: Housing