

SYMAP[®] R

Plug in

Variants FI, MI, 87M, TI – Technical data



Product Sheet

Product overview

SYMAP® R (Retrofit) is a digital protection relay for use in medium and high-voltage power systems. Because of its integrated protection functions and human-machine interface capabilities, it is an efficient and cost-effective solution for all types of switch bays. With three powerful microprocessors, **SYMAP® R** offers complete protection functions for generators, motors (synchronous and asynchronous), transformers, power lines, and distributions. All protection functions can be activated simultaneously, and there are no limits to using all of them at the same time. A small, integrated PLC allows individual interlocks from controlling functions. A variety of serial interfaces with different kinds of protocols is for communication between **SYMAP® R** units and a central control system.

The **SYMAP®R** product line provides four different device variants:

- **SYMAP® FI** Feeder protection
- **SYMAP® MI** Motor protection
- **SYMAP® 87M** Motor differential current protection (self-balanced and differential type)
- **SYMAP® TI** Transformer (2-winding) / Motor differential current protection (vector groups)



SYMAP® FI – Front panel and rack housing

Product Sheet

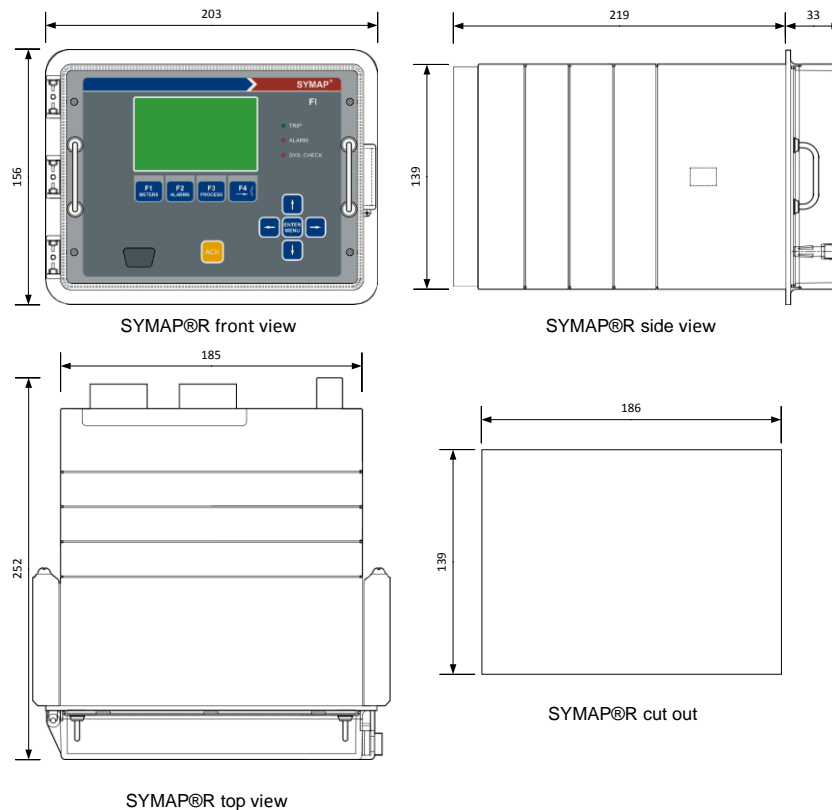
Panel mounting and terminal connections

SYMAP® R is designed to fit into the plug-in housing of previous installations. Due to this fact, a time-saving installation and an easy replacement of a **SYMAP® R** device are guaranteed.



SYMAP®R with plug in housing

Although the **SYMAP® R** devices feature small housing dimensions, they contain comprehensive protection functions for medium voltage systems.



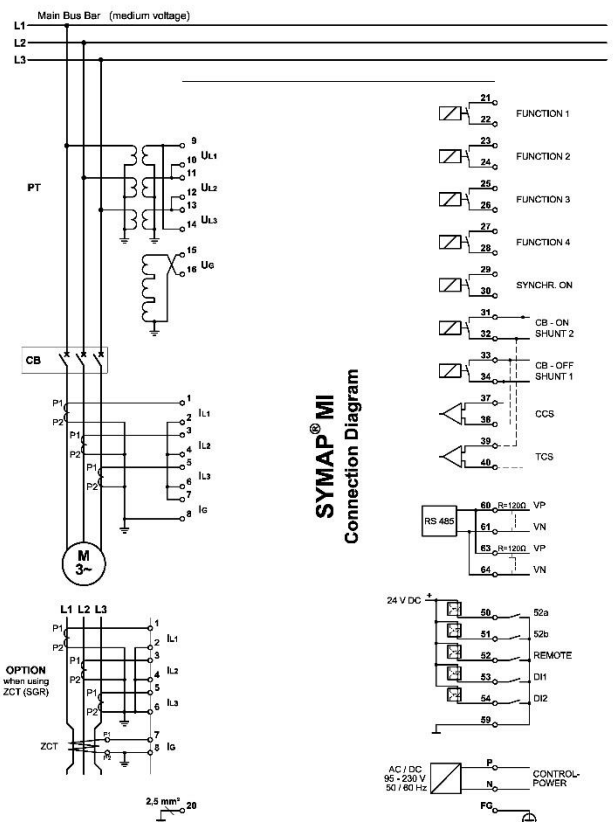
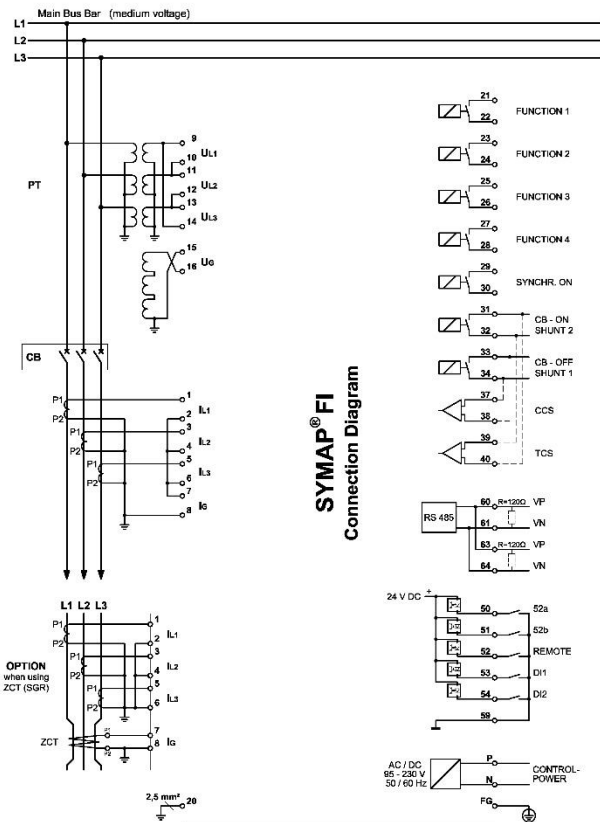
SYMAP® R dimensions and cut out in mm

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SYMAP® R provides the following connections for measurement and control:

- Phase current measurement 3 phase
- Ground current measurement 1 phase
- Ground voltage measurement 1 phase
- Breaker control including trip coil and closing coil supervision (TCS/CCS)
- Phase voltage measurement 3 phase (SYMAP® FI, MI only)
- Differential current measurement 3 phase (SYMAP® TI, 87M only)

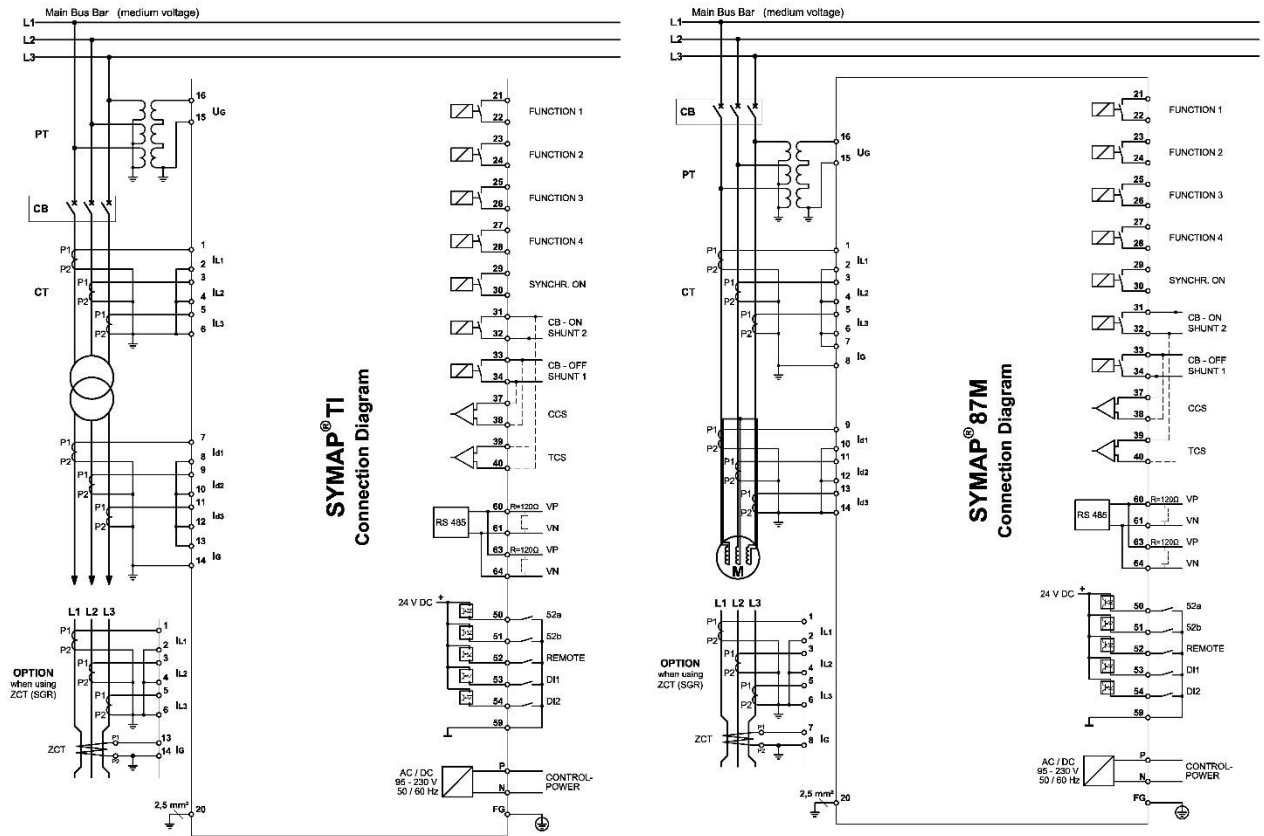
Connection diagrams SYMAP® FI and SYMAP® MI



- 7 Programmable function relay outputs
- 5 Programmable digital inputs 24VDC
- Power supply AC/DC 95-230V, 50Hz/60Hz

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Connection diagrams SYMAP® TI and SYMAP® 87M



- SYMAP® TI: Motor/Transformer differential protection via 6 current measurement inputs
- SYMAP® 87M: Motor differential protection via 3 differential current measurement inputs (self-balancing type and differential type)
- 7 Programmable function relay outputs
- 5 Programmable digital inputs, 24VDC
- Power supply AC/DC 95-230V, 50Hz/60Hz

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Protection functions

The following table shows the device variant related protection functions of SYMAP® R.

ANSI No.	HHI code	Protection function	FI	MI	87M	TI
27	UVR (27R, 27M, 27S)	Undervoltage, instantaneous, definite time	<input checked="" type="checkbox"/>	-	-	-
37	MPR (UCR)	Undercurrent	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
46	MPR (NSR)	Reverse phase current	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
47	POR	Positive phase sequence overvoltage	<input checked="" type="checkbox"/>	-	-	-
47	NSOVR	Negative phase sequence overvoltage	<input checked="" type="checkbox"/>	-	-	-
49	MPR (THR)	Thermal overload protection	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
50	OCR	Overcurrent, instantaneous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ¹
50G/N	OCGR	Current earth fault, instantaneous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
50H	MPR (50H)	Current element to block ANSI 49	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
51	OCR	AC time overcurrent, definite time, IDMT (6 curves)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> ¹
51G/N	OCGR	AC ground overcurrent, definite time, IDMT (6 curves)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
51LR	MPR (51LR)	Locked rotor	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
59	OVR	Overvoltage relay, instantaneous, definite time, normal inverse	<input checked="" type="checkbox"/>	-	-	-
59N	OVGR	Ground overvoltage	<input checked="" type="checkbox"/>	-	-	-
66	MPR (NCHR)	Start inhibit	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
67	DOCR	AC directional overcurrent, definite time, IDMT	<input checked="" type="checkbox"/>	-	-	-
67GS/GD	SGR/DGR/DOCGR	AC directional earth fault, definite time	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
87G/M ²	87M	Generator/Motor differential	-	-	<input checked="" type="checkbox"/>	
87T	DFR	Transformer differential	-	-	-	<input checked="" type="checkbox"/>
94	TCS/CCS	Trip circuit supervision/Closing coil supervision	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
95i	-	Inrush blocking	-	-	-	<input checked="" type="checkbox"/>

available

- not available

¹ transformer primary side and secondary side

² self-balanced type and differential type

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Technical specification SYMAP® R

Description	Condition/Characteristics	
Dimension (W x H x D)	Housing: (203 × 156 × 252)mm Panel cut out: (186 × 139)mm	
Weight	4,3 kg	
Power supply	AC/DC 95-230V, 50Hz/60Hz	
Power consumption	<30W	
Ambient condition	Service temperature	-20°C to +70°C
	Storage temperature	-40°C to +70°C
	Transport temperature	-40°C to +70°C
	Humidity	< 80%
Degree of protection	Front panel	IP54 (IEC60529)
	Terminal side	IP10 (IEC60529)
Voltage measurement	Voltage range:	0-1.2 x 110V/190V
	Frequency range:	45Hz-65Hz
Current measurement	CT secondary current:	1A / 5A
	Max. input current:	1A x20 / 5A x4 continuously, 1A x100 / 5A x50 for 1s, 250A max.
Digital inputs	Voltage	24VDC, supply from SYMAP® R
	Current	<1.1mA / input
Relay outputs, max. switching capacity	FUNCTION 1-4	NO contact, 8A/250VAC, 0.5A/110VDC
	SYNCHR. ON	NO contact, 8A/250VAC, 0.5A/110VDC
	CB-ON	NO contact, 8A/250VAC, 0.5A/110VDC
	CB-OFF	NO contact, 8A/250VAC, 0.5A/110VDC
Communication	RS232	SCADA and setup interface
	RS485	Modbus RTU IEC 60870-5-103