













DIGITAL TACHOMETER FOR ROTATIONAL SPEED - FLOW RATE PMO 2150/51, PMO 4150/51

2 x absolute value (A, B) or absolute difference (A-B) or percental difference ((A-B / B)*100)



Digital tachometers are especially qualified for an exact measurement and monitoring of all time-related measurements, which can be converted into a proportional frequency by appropriate sensors. Rotational speed, velocity, flow rate and related measurements belong to these time-related measurements. Depending on the programming the device measures the absolute value, ratio, percental or absolute difference.

The generation of speed-proportional frequencies results from a pulse wheel mounted on the shaft, which is scanned by a remote sensor. For control technique applications high resolution rotary encoders are coupled directly to the motor shaft.

The measuring method is the multi period measurement principle and the frequency is determined by the reciprocal value of the measured periodic time. The number of periods considered at the measurement value is dependent on the adjusted measurement time and the level of the input frequency. If the period time of the input frequency is smaller than the adjusted measurement time, the frequency average is calculated on all periods, that were counted in the last measurement interval. If the period time is longer than the adjusted measuring interval, the frequency is calculated from the last measured period.

The two-channel type PMO 2150/4150 records both channels simultaneously. For the calculation of a difference or ratio the measured values of both channels are taken over concurrently.













Tecl	hni	ical	l data

MEASURING MODE (PMO 2150, PMO 4150) Absolute value channel A and channel B, absolute (PMO 2151, PMO 4150) (PMO 2151, PMO 4151) Only absolute value channel A FREQUENCY INPUT MV-input FREQUENCY RANGE O,02 Hz 20 kHz O,02 Hz 120 kHz SENSITIVITY SD mV 8 V _{eff} AC IMPEDANCE AC-coupling, 47 Ω AC-coupling, 100 Ω SENSOR SUPPLY ACCURACY OF FREQUENCY MEASUREMENT BETTER THAN 40 x 10 ° of the measuring value DISPLAY DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE OIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit OIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DISPLAY ACCURACY PERCENTAL ± 1 digit OIFFERENCE, RATIO MEASURING TIME FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE 1 0 +70 °C PROTECTION CLASS A acc. to VDE 0110 in mounted condition RELATIVE HUMIDITY S A dac. to VDE 0110 in mounted condition RELATIVE HUMIDITY S ACCURACY BASOLUTE (A/B) and (B/A) Valor (B/A) and (B/A) RELATIVE HUMIDITY A and channel B, apperchal difference (A-B) / ratio (A/B) and (B/A) Wifference (A-B) / ratio (A/B) and (B/A) Wifference (A-B) / ratio (A/B) and (B/A) A convertion A acc. to VDE 0110 in mounted condition RELATIVE HUMIDITY S A basolute value channel A Molitor (A/B) and (B/A) A acc. to VDE 0110 in mounted condition					
FREQUENCY INPUT FREQUENCY RANGE 0,02 Hz 20 kHz 0,02 Hz 120 kHz SENSITIVITY 50 mV 8 V _{eff} AC IMPEDANCE AC-coupling, 47 Ω AC-coupling, 100 Ω SENSOR SUPPLY 8 V/15 V, 60 mA (internally programmable) ACCURACY OF FREQUENCY MEASUREMENT DISPLAY - 19999 99999, 0 4 fixed positions after decimal point or floating point programmable DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY ALOUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE DISPLAY ACCURACY PROCEDURAL SUPPLY CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING MON			·		
FREQUENCY RANGE 0,02 Hz 20 kHz 0,02 Hz 120 kHz SENSITIVITY 50 mV 8 V _{eff} AC 3 80 V _{eff} AC IMPEDANCE AC-coupling, 47 Ω AC-coupling, 100 Ω SENSOR SUPPLY 8 V/15 V, 60 mA (internally programmable) ACCURACY OF FREQUENCY MEASUREMENT Better than 40 x 10 ft of the measuring value DISPLAY ACCURACY -1999 99999, 0 4 fixed positions after decimal point or floating point programmable DISPLAY ACCURACY ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DISPLAY ACCURACY PERCENTAL ± 1 digit	(PMO 2151, PMO 4151)		Only absolute value channel A		
SENSITIVITY 50 mV 8 V _{eff} AC IMPEDANCE AC-coupling, 47 Ω AC-coupling, 100 Ω SENSOR SUPPLY 8 V/15 V, 60 mA (internally programmable) ACCURACY OF FREQUENCY MEASUREMENT Better than 40 x 10-6 of the measuring value DISPLAY - 19999 99999, 0 4 fixed positions after decimal point or floating point programmable DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE -10 +70°C PROTECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	FREQUENCY INPUT		mV-input	V-input	
IMPEDANCE AC-coupling, 47 Ω AC-coupling, 100 Ω SENSOR SUPPLY 8 V/15 V, 60 mA (internally programmable) ACCURACY OF FREQUENCY MEASUREMENT BETTER THAN 40 x 10-6 of the measuring value DISPLAY - 19999 99999, 0 4 fixed positions after decimal point or floating point programmable 40 x 10-6 of the measured value ± 1 digit DISPLAY ACCURACY ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition		FREQUENCY RANGE	0,02 Hz 20 kHz	0,02 Hz 120 kHz	
Sensor Supply ACCURACY OF FREQUENCY MEASUREMENT Better than 40 x 10-6 of the measuring value - 19999 99999, 0 4 fixed positions after decimal point or floating point programmable DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70 °C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² Isolation CLASS A acc. to VDE 0110 in mounted condition		Sensitivity	50 mV 8 $V_{\rm eff}$ AC	3 80 V _{eff} AC	
ACCURACY OF FREQUENCY MEASUREMENT Better than 40 x 10-6 of the measuring value DISPLAY - 19999 99999, 0 4 fixed positions after decimal point or floating point programmable DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition		IMPEDANCE	AC-coupling, 47 Ω	AC-coupling, 100 Ω	
DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² Isolation CLASS A acc. to VDE 0110 in mounted condition	SENSOR SUPPLY		8 V/15 V, 60 mA (internally programmable)		
floating point programmable DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² Isolation CLASS A acc. to VDE 0110 in mounted condition	Accuracy of frequency measurement		Better than 40 x 10-6 of the measuring value		
ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL ± 1 digit DIFFERENCE, RATIO MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable Functions Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10%, 47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70 °C PROTECTION CLASS HOUSING Frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² Isolation CLASS A acc. to VDE 0110 in mounted condition	DISPLAY ACCURACY ABSOLUTE VALUE, ABSOLUTE DIFFERENCE DISPLAY ACCURACY PERCENTAL		, , , , , , , , , , , , , , , , , , ,		
MEASURING TIME 300 ms, 1 s, 2 s, 3 s average value DIGITALINPUT CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70 °C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition			40×10^{-6} of the measured value ± 1 digit		
CONNECTION Switch contact, open collector, or 5-V-digital level, inversion programmable FUNCTIONS Programmable on display and holding of limit values (start/stop), display test or shading MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition			. ± 1 digit		
Connection Switch contact, open collector, or 5-V-digital level, inversion programmable Functions Programmable on display and holding of limit values (start/stop), display test or shading Monitoring Watchdog circuit Power supply 230 V/115 V AC ± 10%, 47 63 Hz (voltage selectable by internal solder bridge) Power consumption 6 VA Ambient temperature 0 55 °C Storage temperature -10 +70°C Protection class Housing frontside IP64 acc. to DIN 40050 Connection Plugged terminal blocks 1,5 mm² Isolation class A acc. to VDE 0110 in mounted condition		Measuring time	300 ms, 1 s, 2 s, 3 s a	verage value	
Functions Programmable on display and holding of limit values (start/stop), display test or shading Monitoring Watchdog circuit Power supply 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) Power consumption 6 VA Ambient temperature 0 55 °C Storage temperature -10 +70°C Protection class Housing frontside IP64 acc. to DIN 40050 Connection Plugged terminal blocks 1,5 mm² Isolation class A acc. to VDE 0110 in mounted condition	DIGITALINPUT				
MONITORING Watchdog circuit POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Connection		Switch contact, open collector, or 5-V-digital level, inversion programmable		
POWER SUPPLY 230 V/115 V AC ± 10% ,47 63 Hz (voltage selectable by internal solder bridge) POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Functions		Programmable on display and holding of limit values (start/stop), display test or shading		
POWER CONSUMPTION 6 VA AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Monitoring		Watchdog circuit		
AMBIENT TEMPERATURE 0 55 °C STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Power supply		230 V/115 V AC \pm 10% ,47 63 Hz (voltage selectable by internal solder bridge)		
STORAGE TEMPERATURE -10 +70°C PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Power consumption		6 VA		
PROTECTION CLASS Housing frontside IP64 acc. to DIN 40050 CONNECTION Plugged terminal blocks 1,5 mm² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	Ambient temperature		0 55 °C		
CONNECTION Plugged terminal blocks 1,5 mm ² ISOLATION CLASS A acc. to VDE 0110 in mounted condition	STORAGE TEMPERATURE		-10 +70°C		
ISOLATION CLASS A acc. to VDE 0110 in mounted condition	PROTECTION CLASS		Housing frontside IP64 acc. to DIN 40050		
	Connection		Plugged terminal blocks 1,5 mm ²		
Relative Humidity ≤ 75% annual mean, seldom slight dew	Isolation class		A acc. to VDE 0110 in mounted condition		
	Relative humidity		\leq 75% annual mean, seldom slight dew		











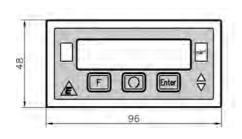


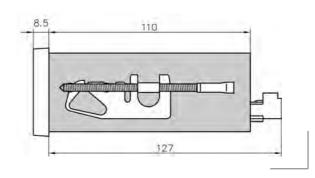
peed Pressure Flow Rate

Options

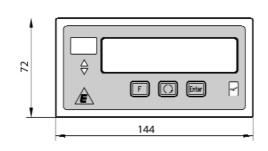
- N3 Power supply 18 30 V DC, 6 watt, galvanically isolated from input and analog output, test voltage 1,5 kV acc. to VDE 0100, part 410
- Transducer output, isolated 0(4)...20 mA, burden 500 A, 0(2)...10 V, max. load 2 kA, accuracy 0,1%, 12 bit D/A converter with LSB-PWM (resolution better than 14 bit), measuring time/effective dead time 30 ms, 100 ms or 100 ms with digital 1 pol. filter T63% = 600 ms, updating rate 2,6 ms
- G2 2 independent limit switches, isolated change-over-contacts, 250 V, 1 A 50 W, load current/non-operate current, hysteresis adjustable per channel
- G3 3 limit value, (not in connection with option I) only in connection with option G2, isolated change-over-contact, 125 V AC/0,4 A 30 V = /2 A, load current/non-operate current, hysteresis adjustable per channel
- sensor supply 24 V DC, 50 mA

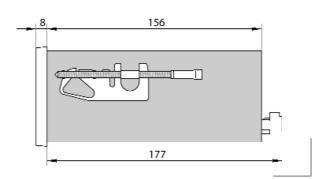
Dimension illustration - PMO 2150/2151

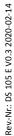




Dimension illustration - PMO 4150/4151





















Notes



Your local contact: