

Phase References processing and Digital I/O card

PMS-341 PLUS — PMS-341P

KEY FEATURES

- Phase reference processing and monitoring card for the PMS-300 PLUS rack system
- 2x independent phase reference inputs up to 20KHz bandwidth $\pm 24V$ range
- Individually configurable phase reference input allowing digital proximity probe, standard analog proximity probe or speed probe.
- Configurable for multiple pulses per revolution
- 2x BNC Outputs for raw or processed phase reference signals
- Adjustable phase reference threshold
- 4x 0-24V Digital Inputs for modeOTP, RotD, Save and one spare digital input
- 4x 0-24V Digital outputs protections signals with zero speed, over speed, stall and rotation direction
- SD card for card registers configuration
- Rack External Communication (Modbus RTU / Profibus DP)
- 2x front push button system reset and alarm reset
- Front side LED indication for reference speed, system reset, alarm reset, modeOTP, RotD, Save and spare digital input

Monitoring solution



Endwinding monitoring



Air gap monitoring



Roller bearing monitoring



Axial thrust position



Shaft & bearing vibration



DESCRIPTION

Introduction

The PMS-341P is a 2 channels phase reference signal processing and monitoring card specially designed for operation with the rack based Protection and Monitoring System (PMS) PMS-300 PLUS.

The PMS-341P consists of processing phase reference signal providing condition monitoring and protection of rotating machinery such as power generation turbine, oil and gas application and auxiliary equipment's.

The card is supplied as a part of the PMS-300 PLUS rack based system and is delivered with PMx-300 PLUS Manager real time software for real time data visualisation and configuration through Ethernet via TCP/IP protocol. The Ethernet port is also used for the communication with the CMS-500 PLUS Orca for long term trending and machine health analysis.

DESCRIPTION (continued)

PMS-300 PLUS rack-based monitoring system

The PMS-300 PLUS rack-based system is the third generation of acquisition system of MC-monitoring SA. Rack-based solutions is the most common solution when a centralized monitoring system is required with a large amount of measurement points. PMS-300 PLUS is the ideal solution for monitoring and protection of large turbines and generators or when a large number of smaller machinery such as motors and fans need to be monitored.

The PMS-300 PLUS offers excellent channel density with up to 32 (up to 8x PMS-314P) measurement channels in a 3HU rack format and 64 channels (up to 16x PMS-314P) in a 6 HU rack format. Furthermore, each PMS-300 PLUS rack-based system includes a power supply card (PMS-361P) and one card including the phase reference, digital inputs interfaces and fieldbus interface (PMS-340/341P).

Each of the PMS-314P card can be independently programmed to provide continuous monitoring, protection and communication with MCm softwares for a broad spectrum of measurement parameters, including vibration, position, air gap, temperature and speed, etc.

Reference Sensors

The PMS-341P input card offers two independent phase reference inputs. Reference inputs allow using a digital proximity probe offering a signal from 0 to +24VDC, a standard analog proximity probe offering an analog signal which should be comprising from -24VDC to +24VDC or a speed probe commonly used in the rotating machinery monitoring equipment (Max +-190V). The appropriate configuration must be done on the board through selectors X4, X7 and X8 (See hardware configuration)

Multiple pulses per revolution

The PMS-341P allow having multiple pulses per revolution. A pulse divider parameter can be set to adjust this number of pulses per revolution. The appropriate configuration must be done on the board through selectors X7 and X8 and with the SD card parameter configuration (See hardware configuration and SD card configuration)

Output raw BNC

the PMS-341P card is equipped with two BNC connectors on the front panel, providing a 1:1 buffered or processed signal output for both reference signals (See hardware configuration via X4).

ModeOTP Digital Input

The ModeOTP signal is provided by the customer's PLC system. This input will cause the selection of another threshold of alarm levels (alert and danger). That allows to prevent tripping of the machine by the PMS-314P cards during machine start-up or change of operational state where others vibration levels are expected. The ModeOTP status is shown via LED on the front of the card.

RotD Digital Input

The RotD signal is provided by the customer's PLC system. This function is used for pump/storage or reversible machines to inform the monitoring system about the direction of rotation. The RotD status is shown via LED on the front of the card. The RotD status is considered without any software delay.

Save Digital Input (only applicable with CMS-500P Software)

The Save signal can be provided by the customer's PLC system and is used to do a raw data snapshot of the actual cyclic RAW data memory of the PMS-314P Cards. The Save status is shown via LED on the front of the card.

DESCRIPTION (continued)

Spare Digital Input

The PMS-341P Card offers one 24V Digital input as spare which is transferred to the processing cards. The spare digital input can be combined with ModeOTP digital input to offer an additional ModeOTP inputs. See the software manual for more information. The spare digital input is only available on the back of the rack.

Digital outputs protection

Four +24VDC digital outputs protection signal indicate if the rotation of the machine is higher (OVER SPEED) or smaller (ZERO SPEED) than configurable threshold, if the acceleration or deceleration (STALL) is higher than configurable threshold and the direction of the rotation (DIR).

Reset System

If for any reason the system shall be restarted, the PMS-341P input module provides a digital input as well as a push button at the front to execute the restart of all the process modules. This allows restarting the system without disconnecting the mains power supply from the back, which can be very difficult in some installations. Due to the reset function is very dangerous function on its function itself (stopping of protection of the machine); the PMS-341P input module must delay this digital input before it is transferred to the backplane and further to the PMS-314P and PMS-330P modules. The Reset System signal must be logic high > 9s to restart the process modules.

Reset Alarm

The PMS-314P and PMS-330P Process Modules can be programmed for latched alarms, means once the measured/calculated value reached the alarm threshold, the alarm stays until it is reset by this digital input. The Reset alarm is available on the back through a 24V digital input or accessible from the front by a push button. The PMS-341P module transfers the digital signal without any delay; but the signal must be logic high for at least 2 seconds before alarms are reset. The 2 seconds can be configured via software individually for each module

Reset Alarm 2nd - Reset Factory Default

The Reset Alarm button has a second function. If the reset Alarm button is pressed during power up of the system, all the PMS-314 and PMS-330 process monitoring modules, reconfigures themselves automatically into a factory default setting. The following parameters are set to factory defaults :

- System Configuration is set to 4x Relative Radial Vibration monitoring for the PMS-314 and 8x +/-10V Single Ended for the PMS-330.

The Network Settings are set to default to the following settings:

- The default IP Address Range of a Rack is 192.168.1.230 + xx, where xx is automatically the slot number. 1-8 for bottom layer, 8-16 for the upper layer (for the 6HU Rack). The subnet mask is 255.255.255.0 and the gateway is 192.168.1.1

The PMS-341P register configuration are not set to default with the reset factory default function.

External Display Interface

The 9 poles sub-D connector allow to connect, upon the customer requirements, an external display for a remote visualization of the operation of each PMS-314P processing monitoring card (maximum of eight cards).

GLOBAL SPECIFICATION

POWER SUPPLIES

Inputs supply voltage	+24V _{DC} (Delivered by PMS-361P card)
Total power consumption	≤ 6W over all voltage range without sensors power supplies
Power supplies to reference probe	2x (one per physical input channel)
	+24V _{DC} (+-1%) or -24V _{DC} (+-1%)
	Polarity: Both physically available on connector
	+1000mA and -250mA maximum

PHASE REFERENCE INPUT CHANNEL

Available conditioning mode	Voltage
Measurement range	-24 V to +24 V (DC-coupling)
Maximum Input voltage range	-190 V to 190V
Frequency Bandwidth input	DC to 50KHz (-3dB), gain 0.374
Input impedance	> 200KΩ between IN+ and 0V inputs
Measurement speed Accuracy	≤ 1% until 300'000 RPM (5kHz)
Digital probe mode	No processing
Standard analogue probe mode	
Frequency Bandwidth	1Hz (-3dB) to 50KHz (-3dB)
Speed probe mode	
Frequency Bandwidth	1Hz to 5KHz (gain ≥ 0.9)
Trigger method	Double proportional threshold Schmitt trigger
Triggering Threshold	77% and 22% of peak-peak reference voltage
Minimum peak-peak voltage det.	256mV

PHASE REFERENCE DIGITAL THRESHOLD

Used for	Reference visualization LED, multiple pulse per revolution, speed monitoring and digital output protection
Trigger method	Crossing of threshold with or without hysteresis
Triggering threshold	Rising of falling edge, configurable level set with KPxTHRESH-OLD parameter.

MULTIPLE PULSE PER REVOLUTION

Glitch filter	50us
Minimum reference pulse length	60us

DIGITAL OUTPUTS

Outputs Voltage	+24V
Outputs Current	Maximum 700mA
Outputs protection	Shorted load and overtemperature, undervoltage shutdown, current limiter
Levels	0V / +24V logic level

GLOBAL SPECIFICATION

DIGITAL OUTPUTS (continued)

Mapping

Zero speed	+24V if reference period is < KPxTIMEOUT parameter (Logical KP1 OR/AND KP2 depending of ZEROSPEEDMODE parameter)
Refresh rate	reference period
Over speed	+24V if reference speed is > KPxMAXSPEED parameter (Logical KP1 OR/AND KP2 depending of OVERSPEEDMODE parameter)
Refresh rate	reference period
Stall	+24V if reference acceleration is > KP1STALLMAXACC parameter or > KP1STALLMAXDEC parameter (Logical KP1 OR/AND KP2 depending of STALLPEEDMODE parameter).
Refresh rate	1 second
Direction	Indicate direction of rotation depending of REVERSEPOLARITY parameter and reference probe position
Refresh rate	reference period

DIGITAL INPUTS

Logical Level	+24V logic level (<3V : Low level and >12V : High level)
Isolated	No
DI Name	
RST AL	A high level resets the latched alarms.
OTP	A high level switches the alarm level from OTP 0 to OTP 1.
ROT D	A high level means clockwise direction
SAVE	A high level saves a dataset of raw signal.
Digital IN	Use for OTP mode combination
Reset System	A high level restarts the PMS-341P card

BNC - BUFFERED OUTPUTS

Signal	Buffered raw signal of reference probe
Bandwidth	DC to 29KHz—Low pass filtering
Scaling	1V:1V, non-inverting or processed
Minimum load on BNC	> 50KΩ
Maximum cable length on BNC	5m with typical capacitance of 100pF/m

GLOBAL SPECIFICATION

LED INDICATOR

Reference (2x)	Indicates the reference frequency
M-OTP (1x)	Indicates Mode OTP status (ON = OTP 1)
Rot D (1x)	Indicates direction of rotation (ON = Clockwise direction) with digital input RotD. Rot D LED also indicates direction of rotation (ON = depending of reference probes placing and REVERSEPOLARITY register) with digital output direction (when both
Save (1x)	Indicates Save data status (ON = Save a RAW dataset)
DI (1x)	Indicates Spare digital Input status
Reset System (1x)	Indicates Reset System status (ON = Restart processing cards)
Reset Alarm (1x)	Indicates Reset Alarm status (ON = Reset latched alarms)

ENVIRONMENTAL CHARACTERISTICS (when used with PMS-300P rack system)

Temperature range	
Operation	0°C to +55°C
Storage	-20°C to +70°C
Humidity	Up to 90% (non-condensing)
Protection rating (IEC 60529)	IP30

APPROVALS (when used with PMS-300P rack system)

Conformity	European Union (EU) declaration of conformity (CE marking) United Kingdom (UK) declaration of conformity (UKCA marking)
EMC	EN 61326-1
Electrical Safety	EN 61010-1
Environment management	RoHS compliant (2011/65/EU)
Environmental testing	
Dry heat testing	IEC-60068-2-2
Damp heat steady state	IEC-60068-2-78
Environment pollution	Degree 2, according IEC61010-1

ORDERING INFORMATION

Part type	Ordering code	Description
PMS-341P	20.341.400	PMS-341P Process Monitoring Card
PMS-341P BPRAW	20.341.410	PMS-341P Process Monitoring Card with RAW outputs at the back of the rack (takes two slots)

FIRMWARE OPTION

Part type	Ordering code	Description
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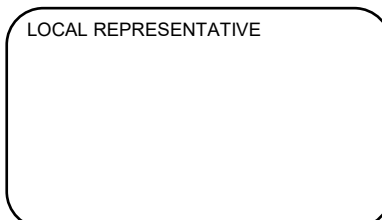
Accessories

Part type	Ordering code	Description
	<i>Coming soon</i>	

MC-monitoring Quality certifications



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