

- **Phase angle measurement $-180^{\circ} \dots +180^{\circ}$**

Accuracy: better than 1°

Resolution: 0.1°

Phase angle offset and sign configurable

Frequency range from 40 to 70 Hz

- **Two isolated voltage inputs**

Two input range 150Vac and 400Vac

- **Up to 3 analog outputs**

- **2 relay outputs option**

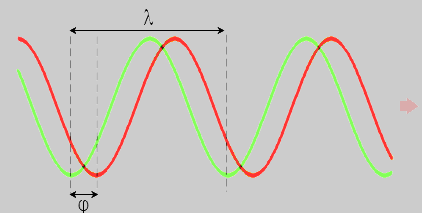
- **Ethernet Modbus TCP link option**

Embedded Web server

6 Modbus TCP concurrent connections

- **LCD display**

2 lines of 16 characters



PHL165 allows measuring the phase angle between two signals of the same frequency, insulated entries and internal filters offer a high rejection of common mode disturbances for reliable measurement in an industrial environment.

Applications

- Control of rotating machine.

Measures and display

- Frequency of each input, phase difference in degrees.

Measure inputs

2 isolated voltage inputs, 2 input ranges (150 V and 400 V).

Analog output (option /S)

- 1 to 3 isolated analog outputs. Fully configurable:
 Range of angle to monitor (from -180° to $+180^{\circ}$ C)
 Type and range of analog output (0 ... 10 V, 0 ... 4 ... 20 mA)
 response time (filter) and limitation ... adjustable for each output.

Relay outputs

- 2 relays (250V / 10A) for threshold on phase angle.
 - Threshold, direction, hysteresis and delay individually adjustable on each relay (ON and OFF delays).

Communication (option /CMTCP)

- Ethernet 10/100 T base (RJ45 connection) Modbus TCP
 - Embedded Web server for direct visualization of measures by using a web browser.

Configuration

- The device can be configured via the front face or the RS232 link.
 USB to RS232 cable supplied separately.
 - Firmware update is possible via the USB serial link.

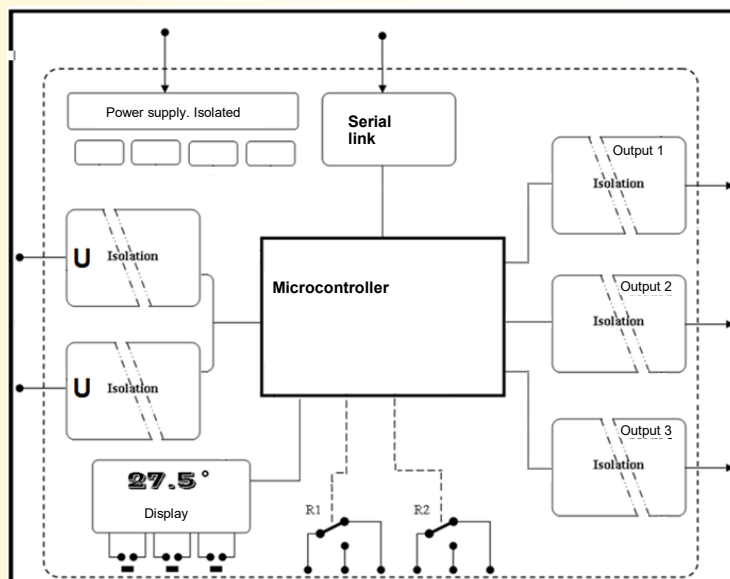
Font Face

- LCD display with 2 lines of 16 characters (back-lighted).
 measurement display ("display" button)
 - Three push buttons to configure the product:
 Initial angle offset, change of angle sign, analog output, relays,
 communication IP address, mask

Feature

- DIN standard modular housing (9 modules, ~161 mm).
 - connection on spring terminal block (max section 1 mm^2),
 (option: screw terminal block, max section 2.5 mm^2).
 - degree of protection: IP20.
 - Conformal coating.

Synoptic:



Version and order code:

PHL165 : Phase meter with 1 analog output.

OPTION

- /S2 : Phase meter with 2 analog outputs.
- /S3 : Phase meter with 3 analog outputs.
- /R1 : + 1 relay.
- /R2 : + 2 relays.

Communication option

PHL165/CMTCP: Ethernet MODBUS TCP link

(analog output, relays and Modbus TCP options can be combined)

Request a quote

MESURE INPUTS U1, U2

| TYPE | RANGE | |
|------------------------|--------------|--------------|
| Voltage | 0...150Vac | (low input) |
| Input impedance | > 1 Mohms | |
| voltage | 0...400Vac | (high input) |
| Input impedance | > 4 Mohms | |
| power consumption | < 0.1 Watt | |
| Continuous overvoltage | 2U nominal | |
| Measurement rate | continuously | |
| Frequency | 40 to 70 Hz | |

METROLOGY

| TYPE | RANGE | ACCURACY | RESOLUTION |
|-------------|-----------|-------------|---------------|
| Frequency | 40...70Hz | +/- 0.01 Hz | +/- 0.0025 Hz |
| Phase angle | +/- 180° | +/- 1° | +/- 0.1° |

Measuring conditions: Frequency : 40.....70 Hz, peak factor <1.5, sinusoidal signal, voltage from 50 % to 120 % of input range, ambient temperature from 15 to 30°C

Note: non-compliance with the above conditions (input range underutilization, harmonic distortion, saturated climate conditions, ...) leads to a downgrade of the metrological performances.

POWER SUPPLY

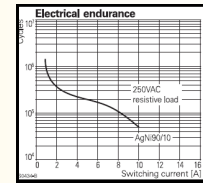
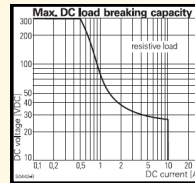
20...265 Vac-dc, 2.5 VA standard

ANALOGICAL OUTPUT (12 bits resolution)

| TYPE | RANGE | ACCURACY |
|---|-------------------------------------|-----------|
| Current S1, S2, S3 admissible load: | 0 ... 4 ... 20 mA 0 ... 750 Ohms | +/- 20 µA |
| Voltage S1, S2, S3 Output impedance: | 0 ... 10 V 500 Ohms | +/- 10 mV |

RELAY OUTPUT (option)

2 changeover relays, potential free, switching capacity 10 A / 250 Vac
Adjustable angular threshold in steps of 1° from -180° to +180°
Tripping and release delay from 0s to 60s, resolution of 0.02 seconds,
positive or negative security.



COMMUNICATION (option)

Ethernet 10 /100 T Base, RJ45 connector.
Modbus TCP protocol: Port 502.
HTTP protocol: Port 80.

ENVIRONMENT

| | |
|---|---|
| Operating temperature | -20 to 60 °C |
| Storage temperature | -20 to 85 °C |
| Relative humidity | 85 % not condensed |
| Weight | 350 g |
| Protection rating | IP 20 |
| Dielectric strength | 2500 Vrms |
| input U1/ input U2 / Power / Relays / Analogical output | |
| MTBF (MIL HDBK 217F) | > 2 000 000 Hrs @ 25°C (without Ethernet) |
| Life time | > 150 000 Hrs @ 30°C |

Electromagnetic compatibility 2014/30/UE / Low Voltage Directive 2014/35/UE

| Immunity standard for industrial environments EN 61000-6-2 | | Emission standard for industrial environments EN 61000-6-4 |
|---|-------------------------|---|
| EN 61000-4-2 ESD | EN 61000-4-8 AC MF | EN 55011 group 1 class A |
| EN 61000-4-3 RF | EN 61000-4-9 pulse MF | |
| EN 61000-4-4 EFT | EN 61000-4-11 AC dips | |
| EN 61000-4-5 CWG | EN 61000-4-12 ring wave | |
| EN 61000-4-6 RF | EN 61000-4-29 DC dips | |



WIRING AND OUTLINE DIMENSIONS:

