

OPERATION MANUAL

CMCP545 THRUST POSITION TRANSMITTER

REV.D 9-27-99

Model Description:

The **CMCP545** is a 4-20mA Position Transmitter. It is typically used in conjunction with an eddy-current probe/driver system, and an external readout/monitoring system, to indicate the relative axial position of a rotor within its associated thrust bearing range. In this application, it is recommended that two independent probe/driver/transmitter channels be installed to provide redundancy, and to allow the readout/monitoring system to perform logical comparisons of the thrust readings from each channel prior to taking action on any single alarm condition.

Although the CMCP545 operates from a +24Vdc supply, it is compatible with most non-contact eddy-current probe/driver systems that operate from a -24Vdc supply. (-18Vdc probe/driver systems can also be made to work. Contact the factory for details). The output signal from the probe driver is processed to determine the relative position of the target with respect to the face of the probe. The transmitter output is a standard 4-20mA current proportional to this position within a specified full scale range such as 40-0-40 mils, and is suitable for direct connection to a PLC or DCS monitoring system. A BNC connector on the front of the unit provides buffered access to the probe driver voltage to assist in probe setup.

Power:

The CMCP545 requires externally supplied DC power. The power supply should have a nominal output of +24Vdc and be capable of supplying a minimum of 55mA for each CMCP545 in the system. A linear-regulated, +24Vdc power-supply dedicated to the vibration monitoring system is recommended.

The associated eddy probe/driver system will require an additional -24Vdc supply. This supply should be located next to the +24Vdc supply and have its common side tied to the common side of the +24Vdc supply used for the transmitters. It is recommended that the connection between the power-supply and the transmitters and probe-drivers be made using twisted-shielded instrument cable. The cable shield should float at the transmitter / driver, and be connected to common at the power-supply / system-common end only.

The CMCP545 regulates dc power internally to prevent a fault on the output of one channel from affecting other channels. When power is first applied to the transmitter after connecting the transducer, there will be a delay of approximately 30 seconds before the "OK" LED turns "ON".

Transducer:

The CMCP545 is factory configured for use with an eddy-current probe-driver system. The specific sensitivity in mV/mil is identified by a dash number immediately following the basic P.N. on the side label. Example: "-200" indicates the transmitter expects the associated probe driver to have an output sensitivity of 200mV/mil. Other sensitivities than indicated here are available.

Transducer Cable:

It is strongly recommended that the transmitter be mounted as close as practical to the associated probe driver. This will help to minimize interference from external noise sources. A twisted-shielded, properly installed cable from the probe driver to the transmitter is necessary to obtain reliable operation. The cable shield should be open at the probe driver, and connected to common (xdr "-" terminal) at the monitor/transmitter input only. The cable should be routed as far away from other electrical circuits as possible, and routed through metal conduit where necessary to minimize noise pickup.

Transducer OK Circuit:

The CMCP545 incorporates a transducer "OK" circuit. This feature continuously monitors the probe-system output voltage. If this voltage exceeds preset "OK" limits, the 4-20 mA output current is reduced to less than 2 mA (typically 0 mA) to allow detection of the fault condition at the associated monitoring system. A green "OK" LED on the front of the unit (normally "ON" in an "OK" condition) turns "OFF" to provide a local indication of the fault condition. This circuit will effectively detect open, shorted, or reversed transducer connections. If a fault is detected and then subsequently removed, there will be a delay of approximately 30 seconds before the unit returns to the "OK" condition and the "OK" LED turns back "ON".

Full Scale Range:

The CMCP545 comes factory set calibrated to the full-scale range specified at the time of order.

Option:	Range:
-01	20-0-20 mils (40 mils total)
-02	40-0-40 mils (80 mils total)

The factory calibrated range is listed on the side label as a dash number. If a range other than shown above is indicated, the unit has been modified or adjusted for a special range.

4-20 mA Output:

The output of the transmitter is 4-20 mA current which is proportional to the zero-to-full-scale range of the unit. IE: If the range is 40-0-40 mils, then 4mA corresponds to -40.0 mils, 12mA corresponds to 0 mils, and 20mA corresponds to +40.0 mils. This output will drive a maximum resistive load of 500 Ohms with respect to system common however, the recommended load is a precision 250 Ohm resistor. This will convert the 4-20mA current to 1-5Vdc at the control/monitor system input. A continuous short to ground (common) on the 4-20 output will not damage it.

Buffered Output:

The CMCP545 provides buffered access to probe driver output voltage via a BNC connector on the front of the unit. This output has the same sensitivity and units as the transducer itself, ie: the same mv/mil. However, the voltage at this output is the opposite polarity of the probe driver output, so a probe driver output voltage of -10.0 Vdc will read as +10.0 Vdc on a digital voltmeter at the buffered output. This output is also available on a screw terminal at the top of the unit.

Calibration / Setup:

The CMCP545 is factory configured for the full-scale range indicated on the side label. The mid-scale (12.00 mA) output has been factory set to correspond to an input voltage of -10.00 Vdc.

One method of performing the initial system setup is to force the machine to the actual thrust position that is intended to be the mid-scale point, and then mechanically adjust the probe gap so that the probe-driver output voltage is -10.00Vdc at this point.

If the probe cannot be accessed for adjustment, or if the only *known position* the machine can be placed in is different from the mid-point, the offset (zero) potentiometer on the front of the transmitter can be adjusted within a limited range to match this known thrust-position as follows:

Note: This does change to total available range, so shifting the mid-point will create an asymmetrical range such as 20-0-60 on a 80 mil total range transmitter.

1. Measure the actual output voltage of the probe-driver with the machine at a *known thrust-position* within the allowable thrust range, and calculate the output current that corresponds to this position within the specified full-scale range of the transmitter. **Note: It is imperative that the installed probe/driver have the appropriate sensitivity and range to cover the necessary mechanical thrust range while staying within driver output voltage limits of -2Vdc to -18Vdc.**
2. Apply the negative voltage determined in step 1, to the transmitter "+" input. This voltage can be from the actual probe-driver output or an external -Vdc supply.
3. Monitor the transmitter output current and if necessary, adjust the "Offset" potentiometer (unmarked but located just below the "XDCR" input terminals at the top of the unit) until the output current corresponds to the calculated reading for the known thrust position within the total range specified for the transmitter.

NOTE: The CMCP545 is factory configured so that target motion towards the probe-face (probe-driver output voltage going *towards zero volts*) will cause the output current to move upscale (towards 20.0 mA).

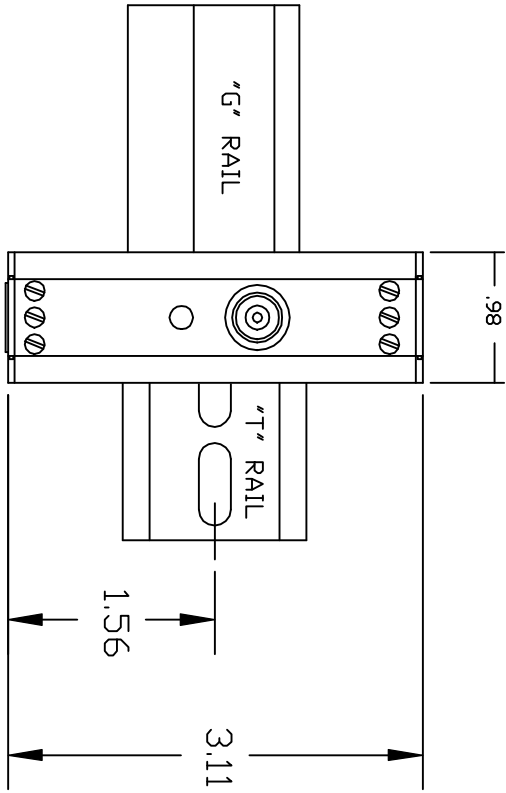
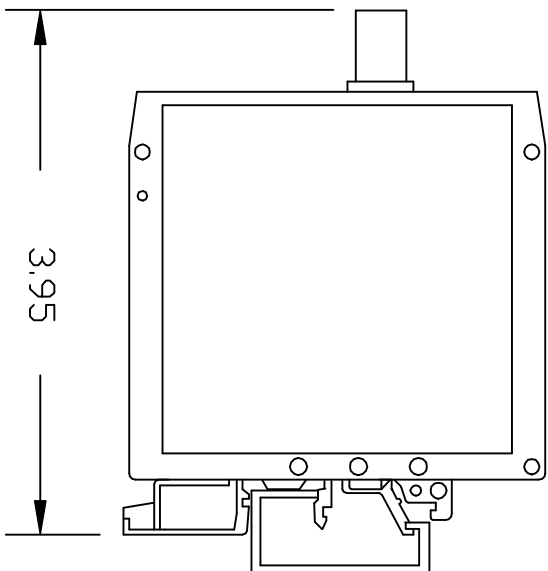
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3

2

1

REVISIONS			
ZONE	REV	DESCRIPTION	DATE



A

B

C

D

4

3

2

1

CMCP500 SERIES TRANSMITTER			
MOUNTING AND OUTLINE			
SIZE	FORM NO.	DWG. NO.	REV.
SCALE	NONE	SHEET	1 OF 1

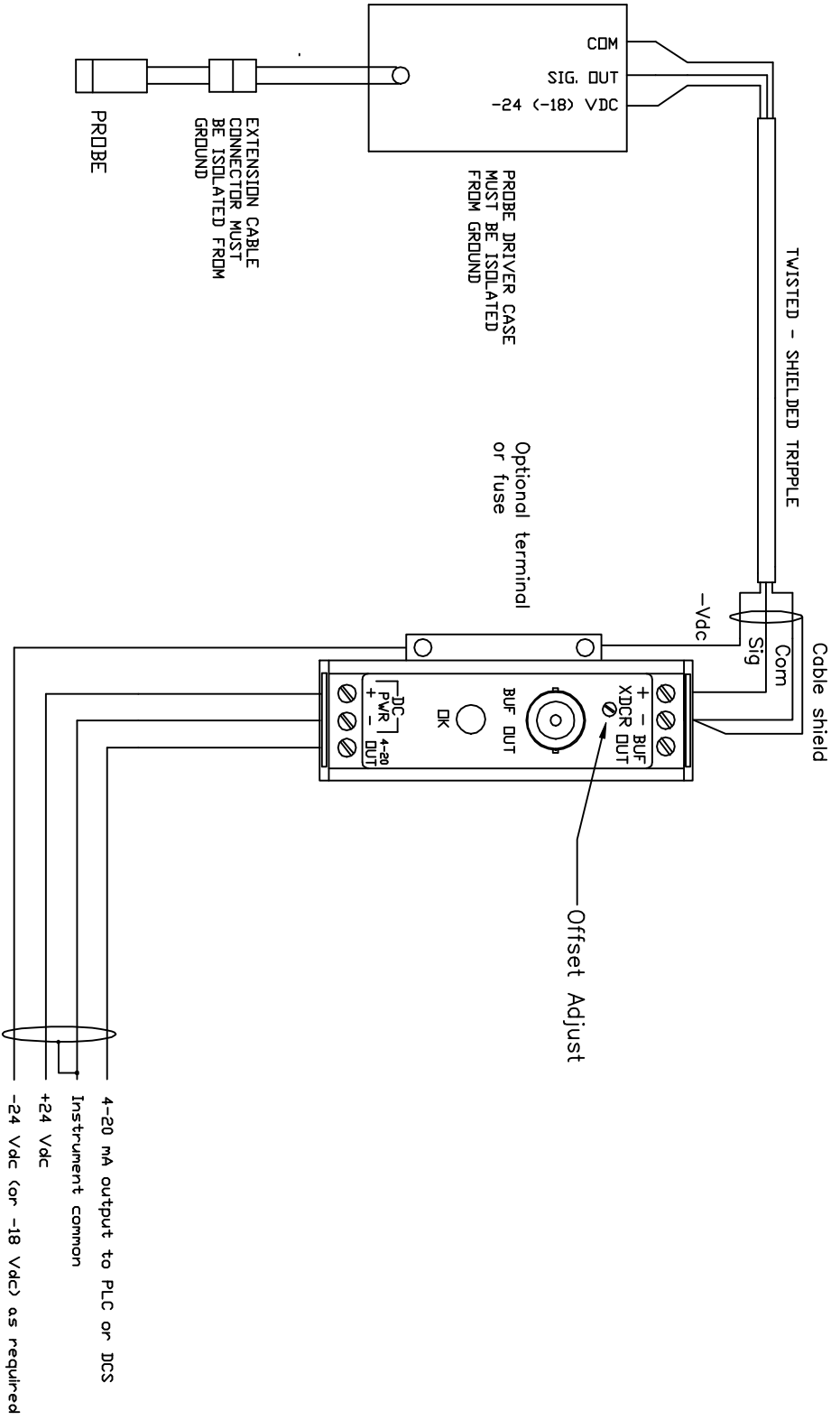
A

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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



NOTE: CABLE SHIELD CONNECTED AT THIS END ONLY

CABLE: Two Twisted pairs with overall shield

4-20 mA output to PLC or DCS
Instrument common
+24 Vdc
-24 Vdc (or -18 Vdc) as required

PROBE DRIVER CASE MUST BE ISOLATED FROM GROUND

EXTENSION CABLE CONNECTOR MUST BE ISOLATED FROM GROUND

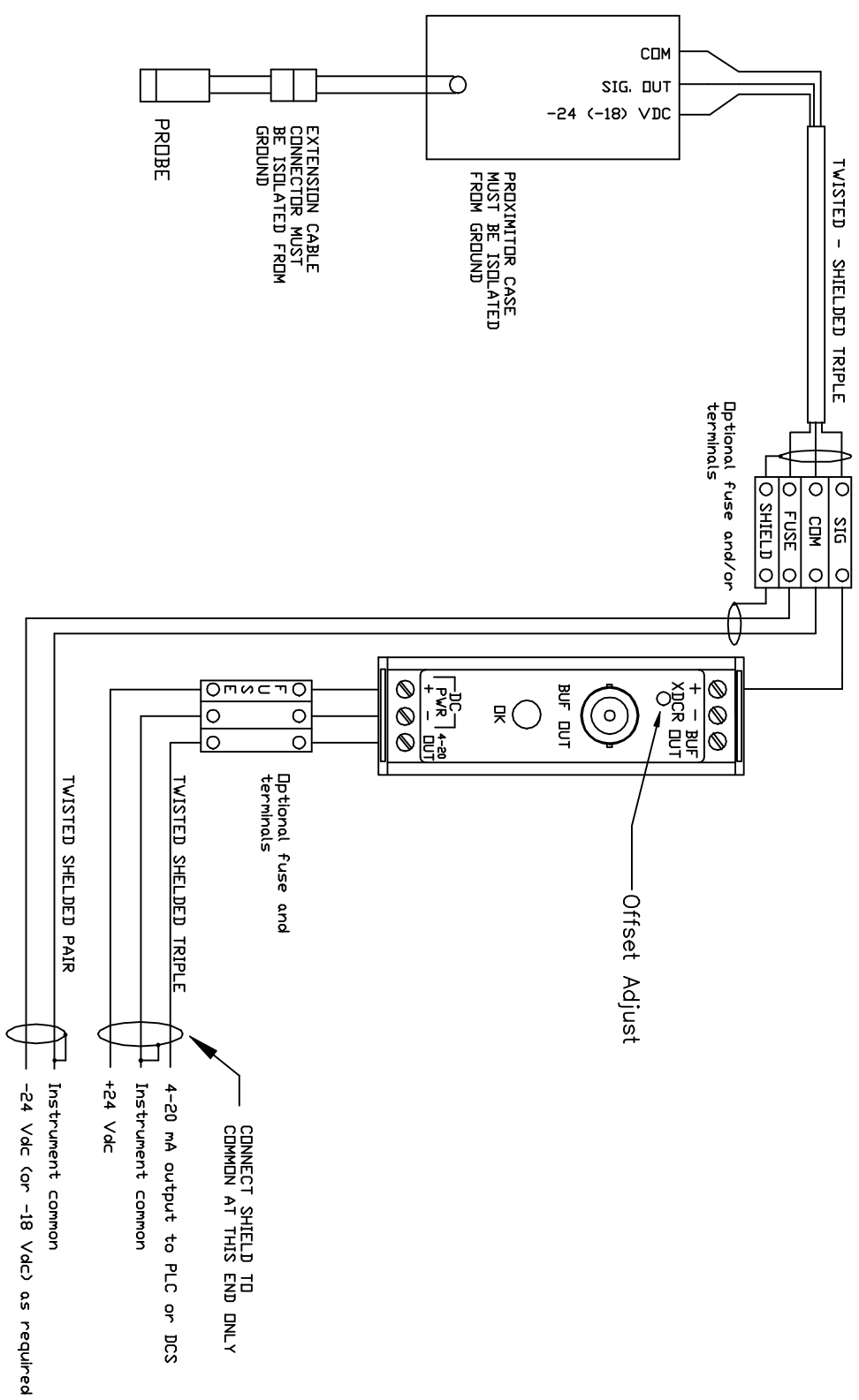
PROBE

CMCP545 SENSOR CONNECTION				SIZE	FORM NO.	DWG NO.	REV
				SCALE	NONE		SHEET 1 OF 1

4 3 2 1

A B C D

REVISIONS			
ZONE	REV	DESCRIPTION	DATE



CMCP545 SENSOR CONNECTION			
SIZE	FORM NO.	DWG NO.	REV
SCALE NONE			
SHEET 1 OF 1			

