

APPLICATION NOTES



MODEL: MLY Torque Transducer

RANGE: 0-yyy mN•m

SERIAL: xxxx

Calibration Constant:

Calibration Date:

MAGNOVA, Inc. Pittsfield, MA 01201

Mechanical Considerations

MLY transducers are installed in such a manner as to couple the torque from a driving device to a driven device. While the customary arrangement is for in-line torque transmission, MLY transducers also accommodate offset arrangements utilizing gears, pulleys, linkages, etc. There are no orientation restrictions, nor is there a preference for which shaft end is coupled to the driving or driven device. This allows the cable exit to fall on either side of the transducer.

Threaded holes in the bottom of the case provide for rigid mounting. *It is important to avoid using screws which penetrate more than 0.22 inches (5.5 mm).* In-line torque transmission with a rigidly mounted case requires the use of flexible couplings or joints at both shaft ends. Such coupling means compensate for (small) angular and radial misalignments between coupled shafts without excessively loading supporting bearings. Some axial compliance is also necessary to accommodate dimensional variations associated with changing operating temperatures.

MLY transducers may also be supported by their shafts. Such "floating" arrangements require a rigid coupling at one shaft end and a flexible coupling at the other end. Either end may be the driver. Case rotation must be prevented by a *non binding* restraint. Common practice is to install a rod having a 5-40 threaded end (with locknut) into the center hole in the bottom of the transducer case. This extension is allowed to bear freely against a fixed surface (two surfaces for rotation in both directions). A strap, wire, spring, or other flaccid member attached to the bottom of the transducer case may also be used. *The cable should not be used to prevent rotation.*

For maximum dynamic response, the coupling means at both ends should be torsionally rigid and have low moments of inertia. For high speed operation, any hardware attached to the shaft should be close fitting and dynamically balanced. Set screws should have plastic (nylon) or brass tips to prevent marring the stainless steel shafts. Clamp type attachments are preferred. For permanent attachment of couplings or shaft diameter adapters, adhesive bonding is satisfactory.

CAUTION: *When tightening (or loosening) set screws or clamp screws take care to hold the device being attached to the shaft (not the transducer case) in order to avoid applying torque to*

the transducer shaft. This caution is especially important when tightening the fasteners during installation of the second coupling and loosening the fasteners on the first to be installed.

Electrical

Basic MLY transducers contain only 5.0 V internal regulators and associated filter capacitors. The output connections come directly from each of two Hall effect integrated circuits. Each output lead is at a nominal potential of 2.5 V above the power supply negative source. The transducer may be powered from any well filtered 8-18 Vdc source. Input voltage variations in this range have negligible effects on the output signal. Typical current requirement is 15 mA, rising as needed to drive low impedance loads.

The Hall cells present significant wide band noise. For many applications, e.g., analog or digital readout of torque, plots of torque vs time, or torque vs other variables, closed loop controllers, etc., the presence of this noise is rarely troublesome. When viewing dynamic torque events on an oscilloscope, a low pass filter (an RC circuit is often sufficient) is recommended to block noise components above the maximum signal frequency of interest. Since inertia and compliance in the overall drive train typically limit mechanical bandwidth to well under 1 kHz, low pass filtering is usually effective. More complex filtering either by hardware or software may be required in wide bandwidth applications.

Electrical connections utilize the following color codes:

ConnectionType	Power(+)	Power (-)	*Output (+)	Output (-)
Pigtail Leads	White	Green	Yellow	Brown
Attached Cable	White	Green	Yellow	Brown
Connector/Cable	Brown	Blue	Black	White

* This lead goes positive for Clockwise torque

CAUTION: *Use care in wiring! Wrong connections can cause non repairable damage.*

Operation

The output signal under zero torque conditions may change with variations in ambient magnetic fields. Zero offset adjustments should therefore be made after the transducer is installed. If the ambient field is sufficiently intense to change the zero torque signal more than 10 mV, the transducer may need to be torque cycled before a stable zero torque signal is achieved. Zero offsets have no significant effect on the calibration constant.

Consult the factory if operation in regions having strong magnetic fields is anticipated. In general, it is recommended to avoid bringing magnets or magnetized tools close enough to touch the case, bearings, or shaft.