

TM-55 Integrating Actuator

Applications

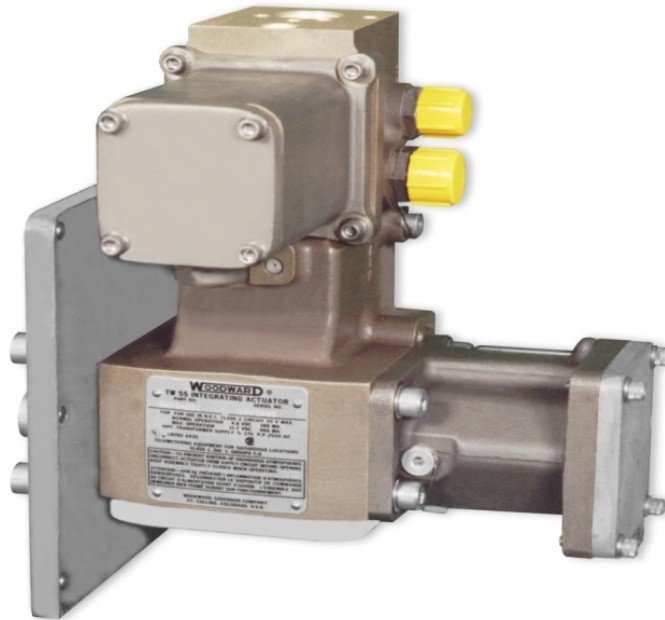
The TM-55 is an integrating type actuator used for controlling diesel and gas engines or steam and industrial applications of gas turbines, and is designed for use with an adapter directly to Woodward liquid and gas fuel valves.

Description

The TM-55 has an electrical position sensor which provides a feedback signal to Woodward electronic controls, such as the 501 (with a digital remote final driver), the NetCon[®] control, or the 2301. This combination allows closed loop control of the actuator output-shaft position.

Features

The TM-55 has an aluminum case with through-hardened stainless steel internal parts. The hydraulic inlet fitting incorporates a 40 µm filter screen for additional contaminant protection.



- Integrating electric hydraulic
- Rotary output maximum work 30 to 75 N·m (22 to 55 lb-ft)
- Corrosion-resistant construction
- UL Listed Class 1, Division 1, Groups C & D
- CSA Listed C22.2

Specifications

OUTPUT

Output Shaft

0.750"–48 serrated by 0.875" long shaft

Work Output

Actuator Operating Oil Pressure kPa (psi)	Maximum Work Output N·m (lb-ft)
2758 (400)	30 (22)
6895 (1000)	75 (55)

Stalled Torque Rating

38 N·m at 2758 kPa (28 lb-ft at 400 psi)
95 N·m at 6895 kPa (70 lb-ft at 1000 psi)

Angular travel

max. 45° clockwise to increase input, viewing end of shaft

Calibration

160 mA null

CONTROL QUALITIES

Time Constant

0.025 second

Maximum Velocity Output Shaft

920 degrees per second

Load Sensitivity

0.05 degrees maximum per lb-ft at 1000 psig hydraulic supply pressure (0.037 degrees maximum per N·m at 6895 kPa hydraulic supply pressure)

Hysteresis

0.25 degree

Repeatability

0.25 degree

Threshold

less than 0.25% of maximum input current of 200 mA

Woodward recommends adequate dither be used on all hydraulic actuators to minimize mA threshold and hysteresis which can result from second stage static friction or hydraulic contamination.

Dither is a low amplitude, relatively high frequency periodic signal that is superimposed on the servovalve input current signal. A typical dither signal generated by a Woodward control is:

- 25 Hz, 0–10 mA (tunable) amplitude
- 25% duty cycle, bipolar, square wave

Adequate dither is defined as that amount which produces no more than 0.013 mm (0.0005 inch) total oscillation in output shaft position.

HYDRAULIC FLUID

Type

mineral or synthetic based oils, diesel fuel, kerosene, gasoline, or light distillate fuels

Ambient Temperature

–40 to +121 °C (–40 to +250 °F)

Recommended Viscosity

6.0 to 400 centistokes
150–200 SSU
ISO 32 grade

Specific Gravity

0.6 to 1.0

Hydraulic Cleanliness Level

ISO 4406 20/18/15 minimum

External Filtration Required

10 µm nominal

Supply Pressure

2758–6895 kPa (400–1000 psig)

Return Pressure

690 kPa (100 psi) maximum

Flow Requirements

Pressure kPa (psi)	Flow L/min (gpm*)	Transient L/min (gpm*)
2758 (400)	1.1 (0.3)	9.5 (2.5)
6895 (1000)	1.9 (0.5)	10.2 (2.7)

* gpm= US gallons per minute

Hydraulic Connection

inlet and return per MS33656

ADJUSTMENTS

Level Adjustment

Changes null current of the actuator.

Null current shifts of up to ±4% of maximum rated current (200 mA) can occur due to variations in the following parameters: hydraulic supply and return pressures hydraulic fluid temperature servovalve and actuator wear.

Due to the inherent null shifts and position drift of all hydraulic servovalves and proportional actuators, engine control applications must be designed with these errors in mind.

Attitude

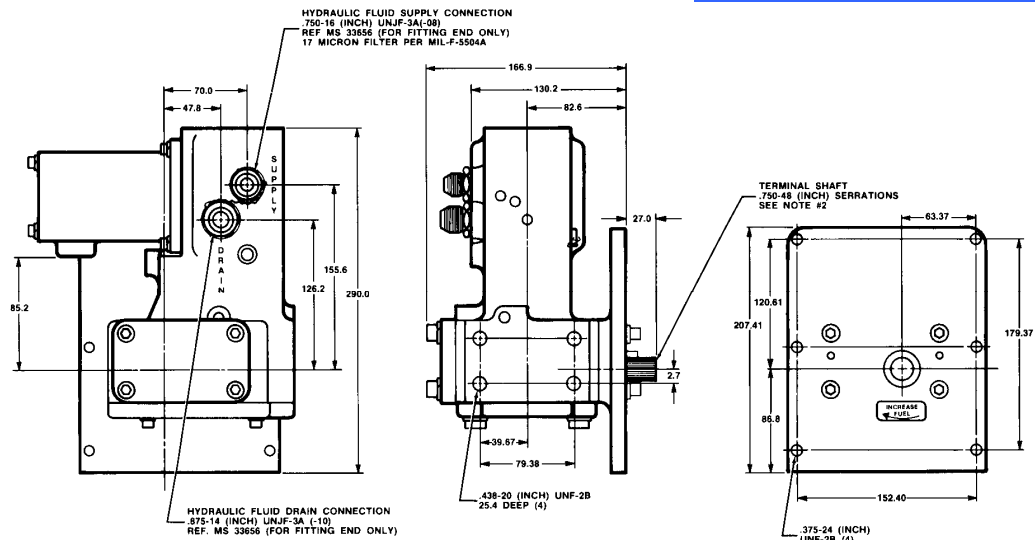
all positions

MASS/WEIGHT

6.6 kg (14.5 lb)

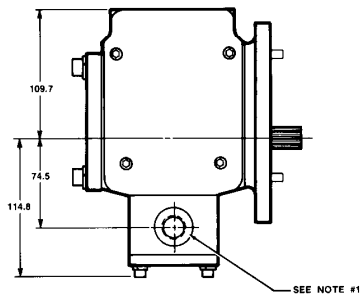
Technical Manual

82768



CONVERSION CHART	
MM	INCH
415	0.161
12.700	0.500
18.750	0.738
25.400	1.000
27.000	1.063
38.100	1.500
39.870	1.569
47.800	1.881
63.370	2.494
70.000	2.755
74.500	2.931
78.380	3.125
82.600	3.252
86.800	3.413
95.200	3.740
109.700	4.318
114.800	4.517
120.610	4.747
126.200	4.968
130.200	5.126
152.400	6.000
155.500	6.125
166.900	6.570
179.374	7.062
207.415	8.165
280.000	11.017
1524.000	60.000

METRIC

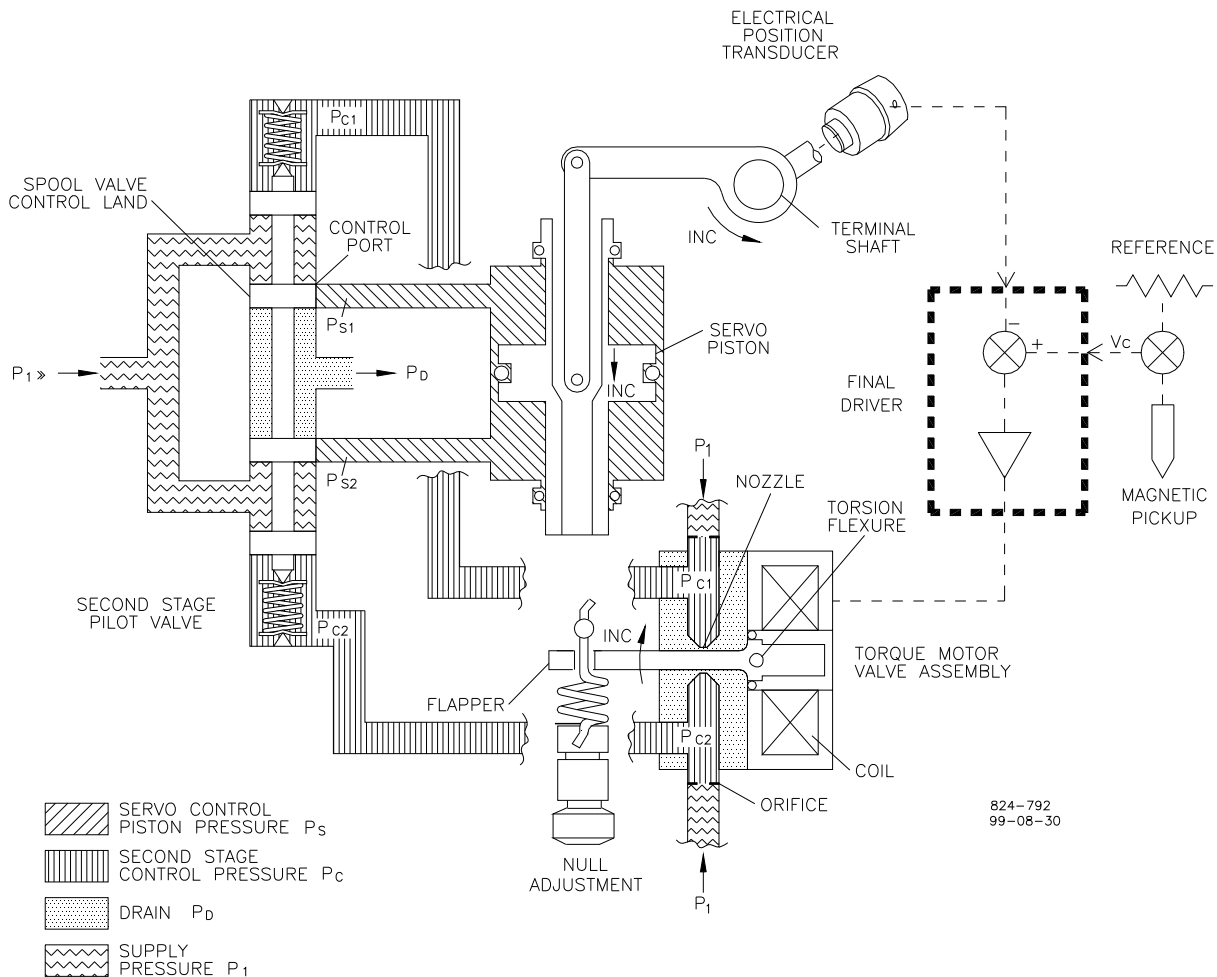


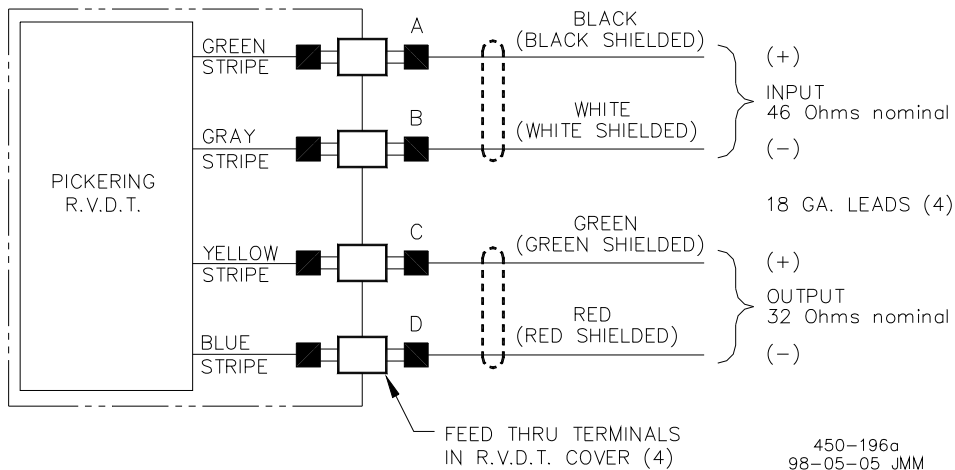
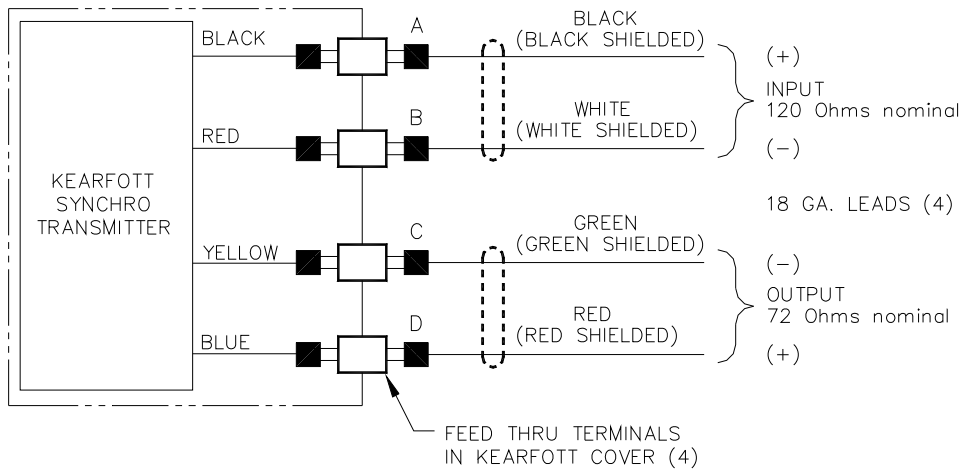
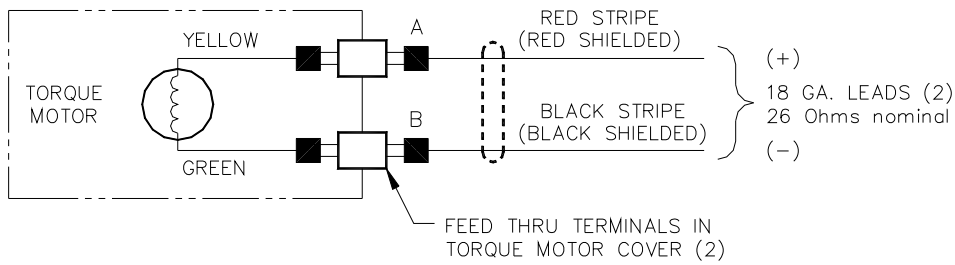
NOTES

1. .500-14 (INCH) NPTF ACTUATOR INPUT SIGNAL ELECTRICAL CONDUIT CONNECTION 18 GAUGE (A.W.G.) WIRE (2)
2. UL LISTED FOR USE IN CLASS 1, DIVISION 1, GROUP C & D LOCATIONS.

82700-C-37

(Do not use for construction)





450-196a
98-05-05 JMM

Typical Wiring Diagrams



PO Box 1519, Fort Collins CO, USA 80522-1519
1000 East Drake Road, Fort Collins CO 80525
Tel.: +1 (970) 482-5811 ♦ Fax: +1 (970) 498-3058
www.woodward.com

Distributors & Service

Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

This document is distributed for informational purposes only. It is not to be construed as creating or becoming part of any Woodward Governor Company contractual or warranty obligation unless expressly stated in a written sales contract.

© Woodward 1980, All Rights Reserved

For more information contact: