Model 41E

Precision Low Profile Load Cell

Approved Approved Approved
Intrinsically safe amp

DESCRIPTION

Model 41E is a low profile "pancake" type load cells. These bonded foil, strain gage load cells are engineered to measure loads from 20 N to 200 kN. The tension/ compression Model 41E is designed with the threaded hole running completely through the center of the cell. Model 41E utilizes two stabilizing diaphragms, which are welded to the sensing member to reduce off-center and side-loading effects. It provides high performance in non-linearity, hysteresis, and repeatability specifications for such applications as tube mills, extruding pr and weighing. Each unit has a welded construction and can be hermetically sealed for added durability. Model 41E load cells are available with optional 0 Vdc to 5 Vdc or 4 mA to 20 mA output.

FEATURES

- 0.1 % accuracy
- 20 N to 200 kN
- mV/V output (standard); 4 mA to 20 mA and 0 Vdc to 5 Vdc (optional) outputs
- Double diaphragm design
- Intrinsically safe available (2N option only)[16]
- CE approved[17]

PERFORMANCE SPECIFICATIONS

Characteristic	Measure
Load ranges[11]	20 N to 200 kN
Linearity, 20 N to 200 N	±0.2 % full scale
Linearity, 500 N to 200 kN	±0.1 % full scale
Hysteresis, 20 N to 200 N	±0.1 % full scale
Hysteresis, 500 N to 200 kN	±0.08 % full scale
Non-repeatability, 20 N to 200 N	±0.05 % full scale
Non-repeatability, 500 N to 200 kN	±0.03 % full scale
Output (tolerance), 20 N to 200 N	2 mV/V ±0.5 % full scale
Output (tolerance), 200 N to 200 kN	3 mV/V ±0.5 % full scale
Operation	Compression/tension
Resolution	Infinite
Standard calibration	Standard calibration for tension/com -pression load cells is in tension only

ENVIRONMENTAL SPECIFICATIONS

Characteristic	Measure
Temperature, operating	-55 °C to 120 °C [-67 °F to 248 °F]
Temperature, compensated	15 °C to 70 °C [60 °F to 158 °F]
Temperature effect, zero	0.004 % full scale/°C
Temperature effect, span	0.004 % reading/°C
Protection rating	IP65[9]

ELECTRICAL SPECIFICATIONS

Characteristic	Measure
Strain gage type	Bonded foil
Excitation (calibration)	10 Vdc
Insulation resistance	5000 mOhm @ 50 Vdc
Bridge resistance (tolerance)	350 ohm (nominal)
Shunt calibration data	Included
Electrical termination (std) 20 N to 200 kN	PTIH-10-6P bayonet plug (MIL-C-26482)
Electrical termination (std) 50 kN to 200 kN	MS3102E-14S-6P

MECHANICAL SPECIFICATIONS

Characteristic	Measure
Maximum allowable load	150 % FS [1]
Weight	See table
Material 20 N to 1.3 kN	17-4PH stainless steel
Material 1.5 kN to 200 kN	4340 painted
Deflection	76 micrometers
Natural frequency	See table

RANGE CODES

Range Code	Available ranges	Range Code	Available ranges
020N0	20 N	05KN0	5 kN
050N0	50 N	10KN0	10 kN
100N0	100 N	20KN0	20 kN
200N0	200 N	50KN0	50 kN
500N0	500 N	100KN0	100 kN
01KN0	1 kN	200KN0	200 kN
02KN0	2 kN		

WIRING CODES

Connector	Unamplified (Std.)
A	(+) excitation
B	(+) excitation
C	(-) excitation
D	(-) excitation
E	(-) output
F	(+) output

DEFLECTIONS AND RINGING FREQUENCIES

Ca-pacity	Natural ringing frequen-cy (Hz)	Weight kg [lb]	Ca-pacity	Natural ringing frequency (Hz)	Weight kg [lb]
20 N	1000	0,36 [0.8]	5 kN	7000	0,68 [1.5]
50 N	1200	0,36 [0.8]	10 kN	10000	0,91 [2.0]
100 N	2000	0,36 [0.8]	20 kN	14000	0,91 [2.0]
200 N	2300	0,68 [1.5]	50 kN	4200	3,99 [8.8]
500 N	3500	0,68 [1.5]	100 kN	6400	4,99 [11.0]
1 kN	4300	0,68 [1.5]	200 kN	12000	4,99 [11.0]
2 kN	5100	0,68 [1.5]			

INTERNAL AMPLIFIERS

Amplifier specifications	Voltage output: Option 2b	Voltage output: Option 2c	Voltage output: Option 2t	Current three-wire: Option 2j	Current two-wire: Option 2k
Output signal	±5 V	0-5 V or ±5 V @ 45 mA	0-10 V or ±10 V @ 45 mA	4 mA to 20 mA	4 mA to 20 mA
Input power (voltage)	±15 V or 26 Vdc to 32 Vdc	11 Vdc to 28 Vdc	15 Vdc to 28 Vdc	22 Vdc to 32 Vdc	15 Vdc to 40 Vdc
Input power (current)	45 mA	40 mA	40 mA	65 mA	4 mA to 28 mA
Freq. resp (amp)	3000 Hz	3000 Hz	3000 Hz	2500 Hz	300 Hz
Power supply rej.	60 db	60 db	60 db	60 db	60 db
Operating temp.	-20 °F to 185 °F	-20 °F to 185 °F	-20 °F to 185 °F	0 °F to 185 °F	0 °F to 185 °F
Reverse voltage protection	Yes	Yes	Yes	Yes	Yes
Short cir. protection	Momentary	Momentary	Momentary	Yes	Yes
Wiring code: connector (std)[4]	A (+) Supply B Output common C Supply return D (+) Output E Shunt Cal 1 F Shunt Cal 2	A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2	A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2	A (+) Supply B Output common** C Supply return** D (+) Output E Shunt Cal 1 F Shunt Cal 2	A (+) Supply B No connection C No connection D (+) Output E Case ground F No connection
Wiring code: cable[3,4,5]	R (+) Supply Bl Output common G Supply return W (+) Output B Shunt Cal 1 Br Shunt Cal 2	R (+) Supply Bl Output common* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2	R (+) Supply Bl Output com* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2	R (+) Supply Bl Output com* G Supply return* W (+) Output B Shunt Cal 1 Br Shunt Cal 2	R (+) Supply Bl (+) Output W Case ground

* Black and green wires are internally connected.
** Pins B and C are internally connected.

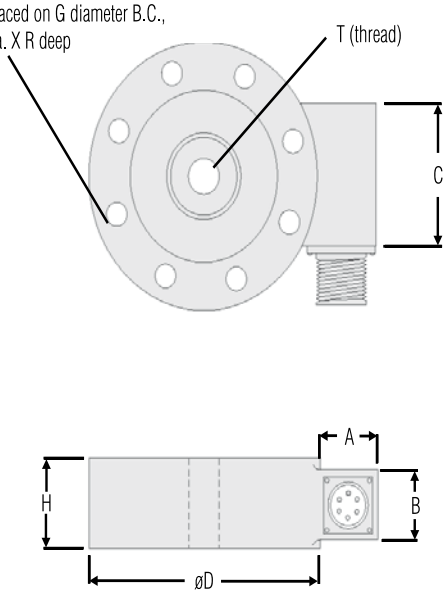
OPTION CODES

	Many range/option combinations are available in our quick-ship and fast-track manufacture programs.
Load ranges	20, 50, 100, 200, 500, 1K, 2K, 5K, 10K, 20K, 50K, 100K, 200K N
Temperature compensation	15 °C to 70 °C 1j. -65 °C to 50 °C 1k. -20 °C to 85 °C
Internal amplifiers[6]	2b. ±5 Vdc 2c. 0 Vdc to 5 Vdc 2j. 4 mA to 20 mA (three-wire) output 2k. 4 mA to 20 mA (two-wire)[13] 2t. 0 Vdc to 10 Vdc output 2u. Unamplified, mV/V output
Internal amplifer enhancements	3a. Input/output isolation[12] 3d. Remote buffered shunt calibration[8]
Electrical termination	6-pin bayonet plug (MIL-C-26482) (20 N to 20 kN) MS3102E-14S-6P or equivalent (50 kN to 200 kN) 6e. Integral cable: Teflon 6f. Integral cable: PVC 6g. Integral cable: Neoprene[9] 6h. Integral cable: Silicone[9] 6i. Integral underwater cable[9] 6j. 1/2-14 conduit fitting with 5 ft of 4 conductor PVC cable 6q. Molded integral cable: Polyurethane[9]
Shunt calibration	8a. Precision internal resistor[7]
Bridge resistance[9]	12a. 1000 ohm (foil) (max. 200 °C) 12b. 5000 ohm (foil) (max. 120 °C)
Bridge type	31a. Dual bridge
Zero and span adjustment	14a. No access to pots 14c. Side access to pots
Electrical connector orientation	15b. Vertical electrical exit port orientation 15c. Radial electrical exit port orientation 15d. Connector on end of cable
Load direction	30a. Compression testing only, positive in compression 30b. Tension and compression testing only, positive in tension 30c. Compression testing only, negative in compression 30d. Tension and compression testing only, positive in compression
Shock and vibration	44a. Shock and vibration resistance
Interfaces	53e. Signature calibration[7] 53t. TEDS IEEE 1451.4 module[10]

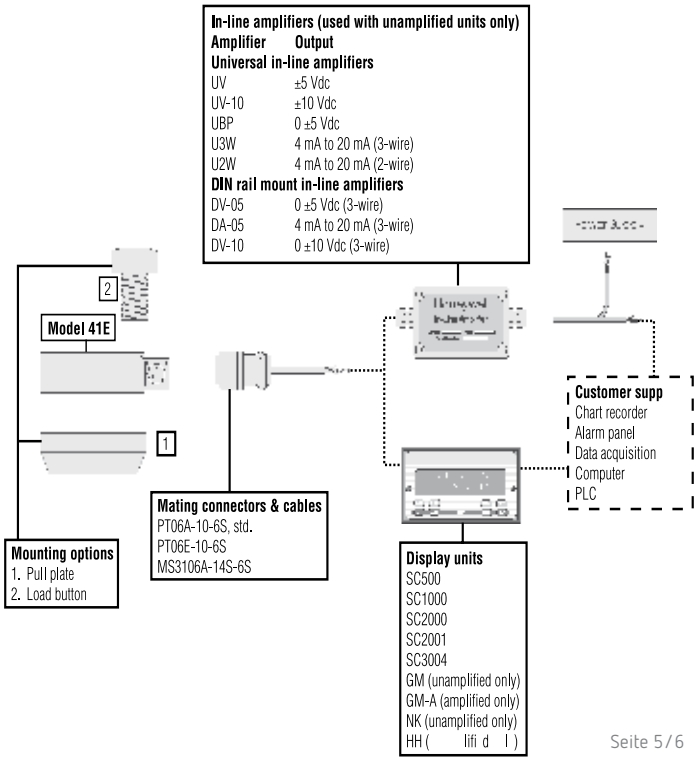
MOUNTING DIMENSIONS

Ranges	D mm [in]	H mm [in]	F#	G mm [in]	K mm [in]	T	A mm [in]	A* mm [in]	B mm [in]	B* mm [in]	C mm [in]	P mm [in]	R mm [in]
20 N	64 [2.51]	20 [0.79]	6	51 [2.00]	5 [0.2]	M6 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	8 [0.31]	5 [0.20]
50 N	64 [2.51]	20 [0.79]	6	51 [2.00]	5 [0.2]	M6 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	8 [0.31]	5 [0.20]
100 N	64 [2.51]	20 [0.79]	6	51 [2.00]	5 [0.2]	M6 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	8 [0.31]	5 [0.20]
200 N	76 [2.99]	25 [0.98]	6	60 [2.36]	7 [0.28]	M10 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	11 [0.43]	7 [0.28]
500 N	76 [2.99]	25 [0.98]	6	60 [2.36]	7 [0.28]	M10 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	11 [0.43]	7 [0.28]
1 kN	76 [2.99]	25 [0.98]	6	60 [2.36]	7 [0.28]	M10 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	11 [0.43]	7 [0.28]
2 kN	76 [2.99]	25 [0.98]	6	60 [2.36]	7 [0.28]	M10 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	11 [0.43]	7 [0.28]
5 kN	76 [2.99]	25 [0.98]	6	60 [2.36]	7 [0.28]	M10 x 1.0-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	11 [0.43]	7 [0.28]
10 kN	89 [3.50]	25 [0.98]	6	70 [2.76]	9 [0.35]	M12 x 1.5-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	14 [0.55]	8 [0.31]
20 kN	89 [3.50]	25 [0.98]	6	70 [2.76]	9 [0.35]	M12 x 1.5-6H	21 [0.83]	64 [2.52]	19 [0.75]	23 [0.91]	32 [1.26]	14 [0.55]	8 [0.31]
50 kN	140 [5.51]	46 [1.81]	8	114 [4.49]	10 [0.39]	M24 x 1.5-6H	32 [1.26]	58 [2.28]	38 [1.5]	38 [1.5]	51 [2.08]	17 [0.67]	11 [0.43]
100 kN	152 [5.98]	46 [1.81]	8	124 [4.88]	14 [0.55]	M36 x 3.0-6H	32 [1.26]	58 [2.28]	38 [1.5]	38 [1.5]	51 [2.08]	NA	NA
200 kN	152 [5.98]	46 [1.81]	8	124 [4.88]	14 [0.55]	M36 x 3.0-6H	32 [1.26]	58 [2.28]	38 [1.5]	38 [1.5]	51 [2.08]	NA	NA

F clearance holes equally spaced on G diameter B.C.,
K diameter thru, c-bore P dia. X R deep



TYPICAL SYSTEM DIAGRAM



NOTES

1. Allowable maximum loads - maximum load to be applied without damage.[2]
2. Without damage - loading to this level will not cause excessive zero shift or performance degradation. The user must consider fatigue life for long term use and structural integrity. All structurally critical applications (overhead loading, etc.) should always be designed with safety redundant load paths.
3. Interconnecting shunt cal. 1 terminal with shunt cal. 2 terminal pro-vides 50 % (unamplified units), 75 % (4 mA to 20 mA three-wire un its) or 80 % (voltage amplified units) of full scale output for quick calibra-ti on. Shunt calibration comes standard with internal amplifier option 2a, 2b, 2c, 2t and 2j.
4. O=Orange; Y=Yellow; B=Blue; Bl=Black; R=Red; Br=Brown; W=White; G=Green. Color specifying cable and number or letter specifying connector.
5. No mating connector necessary for cable option.
6. Adding any internal amplifiers on 20 N to 100 N ranges will take typically six weeks for delivery.
7. Not available with amplified option.
8. Option 3d is not available with option 2k.
9. Availability varies with range, consult factory.
10. Consult factory for TEDS availability with amplified models.
11. This unit is calibrated to Metric (non-Imperial) units.
12. Input/output isolation only available with voltage output (2b or 2c).
13. 5000 ohm bridge required.