

SWITCH-HEAD DYNAMOMETER



The PIAB Switch-Head Dynamometer provides the solution to many problems relating to tension control of conveyor belts, ski lifts, lifting gear and haulages.

PIAB

Force Measurement

Range of Application

The PIAB Switch-Head Dynamometer is an electro-mechanical instrument for measuring tractive force and operating control circuits. It is suitable for use in tension control of belt conveyors, load control of lifts, lifting equipment, ski lifts, haulages and batch control.

Safety

Safety factor 5:1. (Guaranteed to withstand a load of 5 times full scale reading before rupture.)

The instruments may be overloaded by 100% without impairing the accuracy. The sizes 500–25 000 kg have drop-forged steel brackets (SS 2174), giving a guaranteed impact resistance to -20°C .

The O-ring of the pull rod is protected by a neoprene rubber membrane. On instantaneous unloading, e.g. breaking test, the return movement of the pull rod is retarded by a specially designed spring washer (shock resisting disc spring).

Function

The pull rod movement (approx. 10 mm) operates the scale drum through a square thread stem. By the use of a microswitch directly influenced by the pull rod, the dynamometer gives an electrical switching function at a previously set value.

The power absorbing element consists of an arrangement of specially made Belleville type spring washers of a spring steel alloy, so designed as to be entirely free from wear. The arrangement also ensures that the spring washers cannot be overloaded.

Dynamometers up to 3 000 kg capacity can be equipped with 1–3 switch functions. Sizes above 5 000 kg and larger are available with 1–5 switch functions. The electrical connections are made in the terminal box to a numbered connection block.

Protection against Corrosion

The instruments are fully pressure tight and each instrument is pressure tested. No leakage is permitted. The external surfaces are zinc plated with clear chromate passivation. If the instruments are to be used in a very corrosive atmosphere, they can be polyester lacquered.

Method of Setting

1. Loosen the two Allen screws on the microswitch slide. (N.B. Do not remove them completely!)
2. Connect a suitable instrument to the respective terminals in the terminal box that will indicate when the circuit has been closed or broken.
3. Apply a load to the dynamometer until the scale drum indicates the value required.
4. Move the microswitch slide downwards to its lowest position and then upwards until the indicating instrument shows a circuit change.
5. Retighten the Allen screws firmly and slacken off the load. Screws not properly tightened may allow moisture to leak inside and cause corrosion.
6. Reapply the load and check that the switch setting has not been disturbed when retightening the Allen screws.
7. Repeat for each switch.

Contact Function

The contact function is an electrical switching arrangement with a microswitch that may make or break circuits at set load values on the dynamometer. The PIAB Switch-Head Dynamometer with one or two microswitches is available with alternative contact function for each microswitch.

When three, four or five microswitches are used, only one breaking contact function for each microswitch is used as standard. If other contact functions are required, details must be given when ordering.

When the Dynamometer is used in devices where the safety is of utmost importance, breaking function should always be used.

The microswitch has self-cleaning, gold-plated silver contacts, which makes it suitable for low power (below 10 V and/or 60 mA). The switch value can be changed at any time, see "Method of Setting".

Technical Data

Accuracy, dynamometer:	$\pm 0.6\%$ of max. capacity
Accuracy, switch value:	$\pm 1.5\%$ of max. capacity
Temperature range:	$-20^{\circ}\text{C} - +60^{\circ}\text{C}$
Protection class:	IP 67
Rec. max. contact load:	250 V AC, 500 VA, 3A
Service life:	longer than 20×10^6 cycles

Miscellaneous

Scale: white-lacquered with black graduation.

The dynamometer can be graduated in kg, N, lb etc.

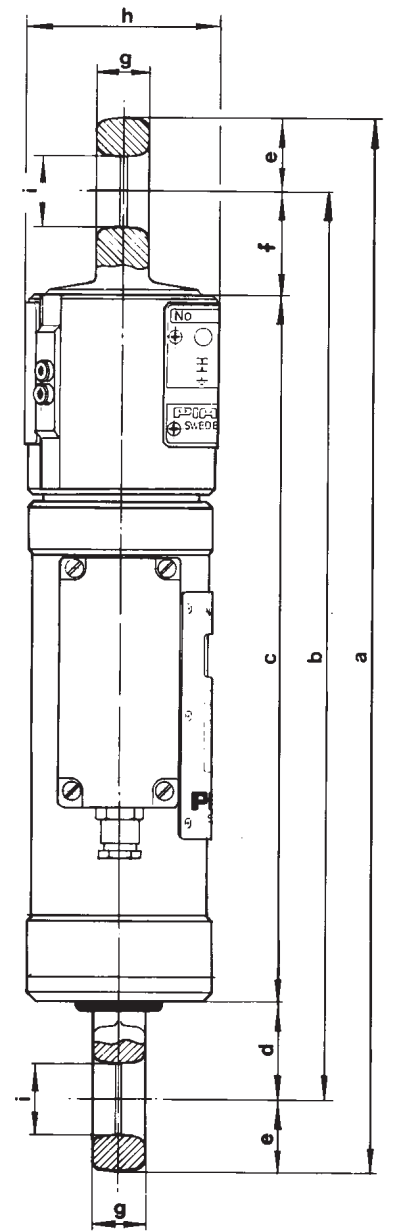
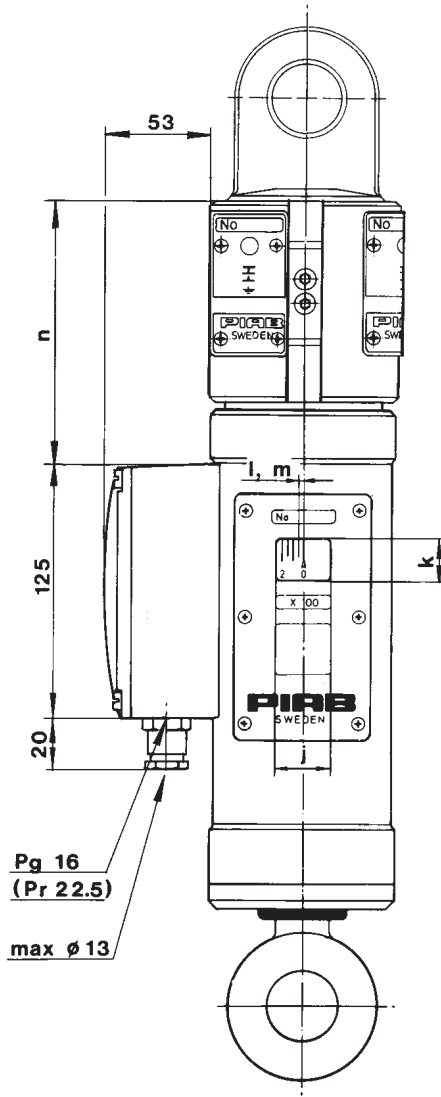
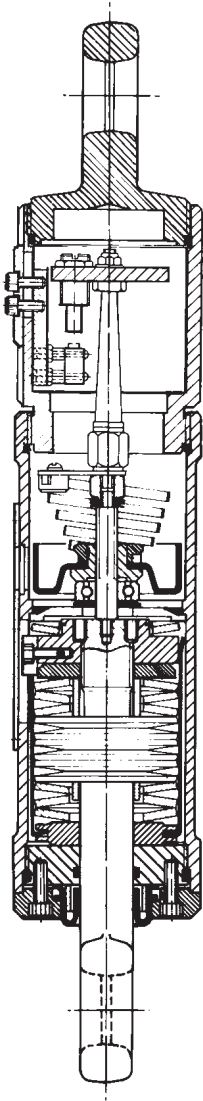
The electrical connections are made in the terminal box to a numbered connection block, see charts bottom right. (Is also available on the inside of the terminal box.)

All instruments are delivered without storage case.

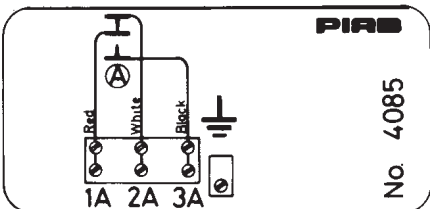
The dynamometers are equipped with brass shields.

Please note: The PIAB Craneweigher is also available with switch-head.

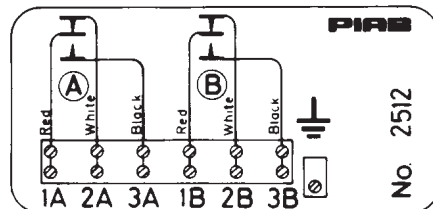




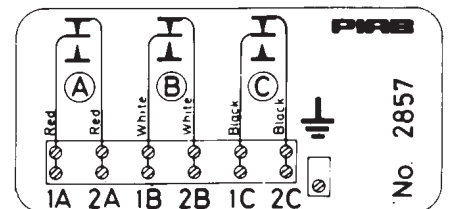
Type	Capacity (kg)	Number of Microswitches	Graduation		Dead Weight (kg)	Measurements (mm)										
			l (kg)	m (mm)		a	b	c	d	e	f	g	h	i	j × k	n
MA	0- 500	1-3	10	3.8	11.5	495	427	334	45	34	48	25	92	33	26 × 20	129
MB	0- 1 000	1-3	20													
M	0- 2 000	1-3	25													
O	0- 3 000	1-3	50	2.5	21	523	439	339	45	42	55	30	125	40	145	
Q	0- 5 000	1-5														
S	0-10 000	1-5	100	3.5	34	573	463	338	60	55	65	45	152	56	118	
U	0-20 000	1-5	200	4.2	95	767	597	392	102	85	103	70	245	81	65 × 23	156
G	0-25 000	1-5														770
E	0-50 000	1-5	250	2.7	134	933	733	489	123	100	121	95	245	115	176	



One microswitch

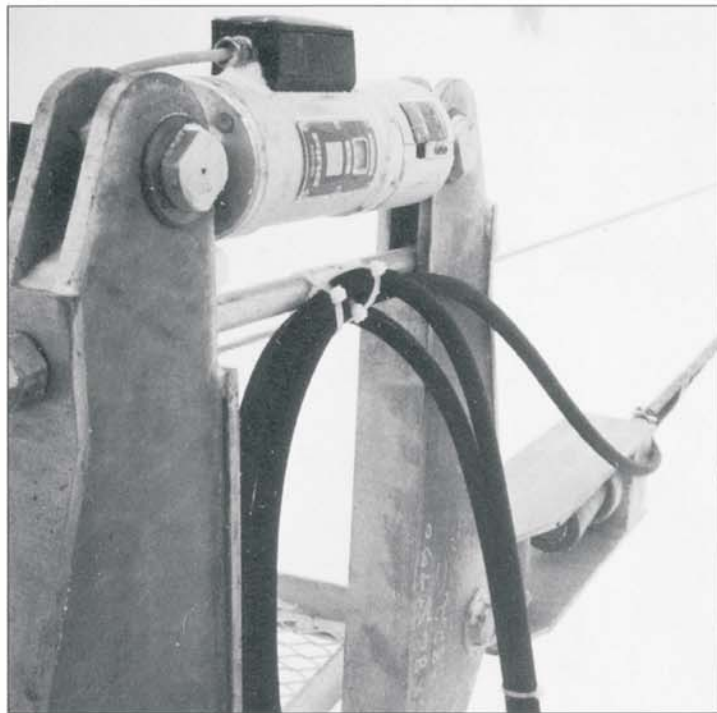


Two microswitches

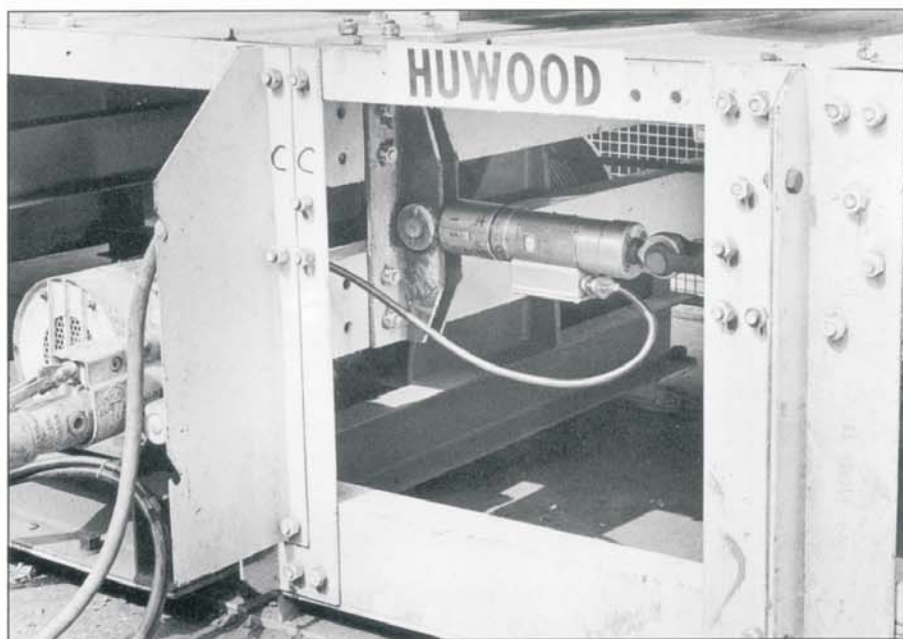


Three microswitches

Applications for the PIAB Switch-Head Dynamometer



A PIAB Switch-Head Dynamometer controls the force in the suspending wire between the poles. Due to the high protection class the instrument functions with great reliability in various environmental conditions. The pictures show a ski lift built by Doppelmayr, Austria.



The picture shows a PIAB Switch-Head Dynamometer controlling the tension of a conveyor belt in a coal mine. The belt is tightened or slackened by control of the power circuits through the instrument. Correct tension in the conveyor belt gives smooth operation and optimum service life.

PIAB

Force Measurement

PIAB Sweden AB

P.O. Box 123 • SE-184 22 Åkersberga • Sweden

Phone +46 (0)8 540 839 00 • Fax +46 (0)8 540 213 64

e-mail: info.force@piab.se

www.piab.net