Starting Up a Force Measuring System

comprising a **force transducer** with strain gauge bridge circuit
and an **Voltage Supply Measuring Amplifier**
SMV-Z (4…20mA) **/ SMV-Y** (0…20mA)

Measuring Principle

A strain gauge bridge arranged in a spring element (force transducer) is adjusted so as to be proportional to the load. At a constant bridge feed voltage U_{supply} an output voltage U_{meas} which is also load-proportional arises at the measuring bridge diagonal and is fed to the input stage of a voltage supply / measuring amplifier.

On the output side a scaled load-proportional current having a net span of 16 mA (SMV-Z) or 20mA (SMV-Y) is available. Its end value can be assigned to the force transducer nominal load either directly or by making use of an offset.

A constant offset (preload) can be zeroed (tared) via the amplifier **hardware**.

A variable offset arising on account of process requirements (e.g. due to friction) must be taken care of (that is tared), if necessary, by **software** means via the sequencing control system.

When the SMV–Z/SMV-Y is in **calibrating** mode a binary signal command (24V=1) enables the measuring range end value to be specifically detected in net-load free mounting condition. For this purpose, the strain gauge bridge is electrically adjusted by the amount of its nominal load span (nominal load of the hooked up transducer). This is added to the existing offset.

The measuring range starting point applicable to a net value is thus formed by the zero set via the **hardware** system.

The **measuring range end value applicable** to an initial value 4mA (SMV-Z) or 0mA (SMV-Y) plus nominal load span 16mA (SMV-Z) or 20mA (SMV-Y).

Therefore, the design of the SMV–Z/SMV-Y enables its nominal load signal span to be exceeded by 1.25.

Note!

The sum (gross) derived from offset (tare) and load (net) must only exceed the nominal load of the connected transducer by the permissible amount (see overload factors of the transducer as listed under ‚Transducer Data'). The overload factors of the transducer will cause (for safety reasons) the gross span of the amplifier to be exceeded. As long as it is not exceeded the transducer will operate within a safe load range.

Electrical Wiring

The terminal assignments of the voltage supply / measuring amplifier are shown in „Connection diagram SMV“, drawing-no.: E 30 391 04.

24 VDC feed voltage (for example from the PLC power pack) is to be connected to terminal strip X1. The static binary signal activating the calibration mode (X1-terminal 10) relates to GND (X1-terminal 3/4). The strain gauge bridge of the respective force transducer (refer to type and nominal sensitivity indication) and the calibration signal path are connected to terminal strip X2. To suit the relevant transducer the SMV–Z/SMV-Y has been adjusted in the Factory to the specified characteristic (nominal sensitivity in mV/V).

Start-Up

Transducer and voltage supply / measuring amplifier SMV–Z/SMV-Y are arranged in the desired mounting position. The terminal assignments have been checked.

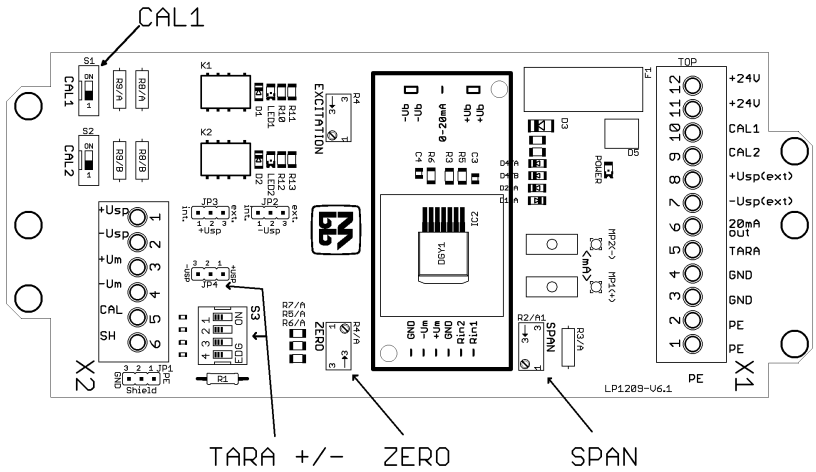
Switch on the supply voltage externally. **Note that the SMV–Z/SMV-Y has not been equipped with a switch!**

If an operating status is detected where the „transducer is in no-load state“ the current output at the tare potentiometer (R4/A) is zeroed via the hardware. In this case any preload that may exist is tared. If this range is not sufficient, a higher tare range can be selected here with the dip-switch S3. JP4 sets the taring direction (positive / negative).

To verify the end value the calibration mode is now activated by applying a binary signal (24VDC=1) at X1-terminal 10 or by set the CAL1-switch S1 to ON position. The signal output must now indicate a nominal value of 16mA (SMV-Z) or 20mA (SMV-Y).

Measuring operations may now be carried out after the calibration mode has been deactivated.

The start-up of transducer and amplifier is now complete.



⚠ Operating, Safety and Warranty Information

Operating, Safety:

The operational safety of the supplied equipment / parts is only guaranteed under normal use as described in this document.

Failure to observe safety instructions may result in equipment damage and / or consequential damage to production machinery.

The installation, commissioning, operation and maintenance of the device may only be carried out by qualified and authorized specialist personnel in compliance with the applicable rules/regulations, safety regulations and accident prevention regulations at the place of use.

Warranty:

The warranty requires the strict observance of the safety instructions given in this document and the operating and maintenance instructions as well as the intended use.

Anzugsmomente von Kabelverschraubungen
Tightening Torques of Cable Glands

Herstellerangaben für Anzugsmomente von Kabelverschraubungen nach EN 50 262
Für Wandungen mit Innengewinde und bei Durchgangsbohrungen mit Gegenmutter.

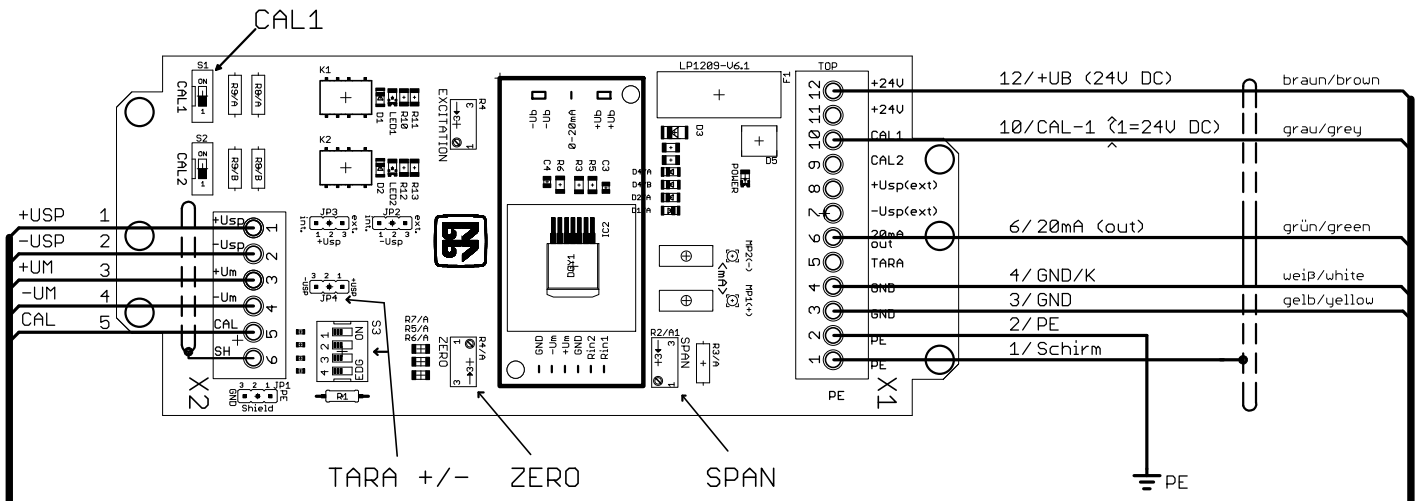
Manufacturer guideline for tightening torques of cable glands as per EN 50 262
Into a housing with female thread or in case of through holes into the lock nut

UNI Dicht Metrisch
UNI Dicht metric

Gewindegrößen *Thread size metric*	Metall *Metal*	Kunststoff *Plastic*
M6	2 Nm	–
M8	4 Nm	–
M10	6 Nm	–
M12	6 Nm	1,5 Nm *
M12	6 Nm	2,0 Nm **
M16	8 Nm	3,0 Nm
M20	10 Nm	4,0 Nm
M25	10 Nm	6,0 Nm
M32	15 Nm	8,0 Nm
M40	20 Nm	10,0 Nm
M50	20 Nm	10,0 Nm
M63	20 Nm	10,0 Nm

* bei PVDF ** bei PA
* *PVDF ** PA*

Tabellenwerte sind allgemeine Vorgaben. Das Drehmoment hängt vom verwendeten Kabel und der Einsatzdichtung ab, sollte aber die in der Tabelle angegebenen Werte nicht überschreiten.
Table figures are general terms of reference. The torque depends on the cable used and the insert sealing; it should not, however, exceed the figures stated in the table.



LiYCY 3x2x0,25
oder
or
LiYCY 5x0,5
vom Messwertaufnehmer
from transducer

LiYCY 5x0,5
zur SPS
to SPS

Farbbelegung je nach vorhandenem Kabeltyp
Wiring configuration acc. to cable type which is in use

X1	Signal	LiYCY 3x2x0,25	LiYCY 5x0,5	LI12Y-C11Y-HF 3x2x0,25
1	+USP	grün/green	braun/brown	weiß/white
2	-USP	gelb/yellow	gelb/yellow	braun/brown
3	+UM	braun/brown	grün/green	grün/green
4	-UM	weiß/white	weiß/white	gelb/yellow
5	CAL	grau/grey	grau/grey	grau/grey

Nr/No	Änderung/Revision	Dat/Date	Name	
001	Tabelle	11.02.19	Neum.	

Datum Date 16.07.18
Bearb. Drw. by Neumann
Gepr. Verif.
Norm.

1 Messbereich
1 Measuring range

Dr.Brandt GmbH
D-44795 Bochum

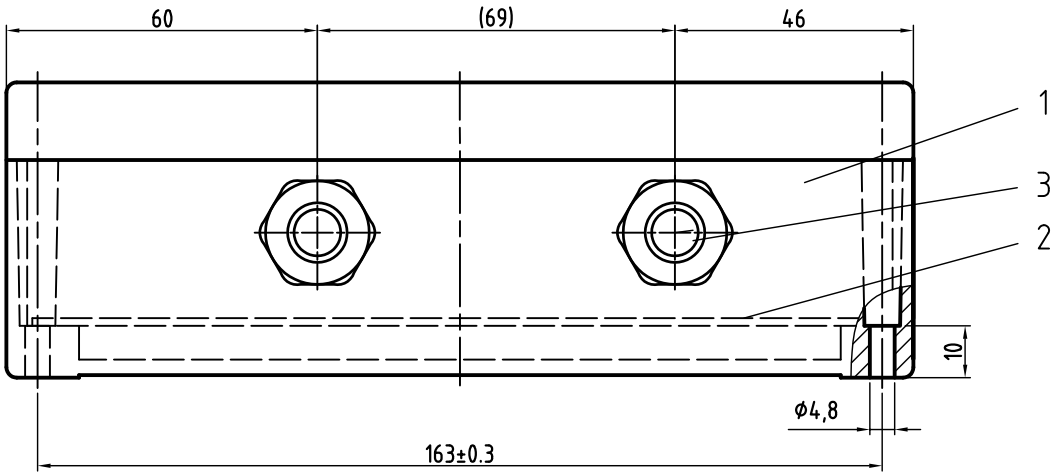
ANSCHLUSSPLAN SMV
CONNECTION DIAGRAM SMV

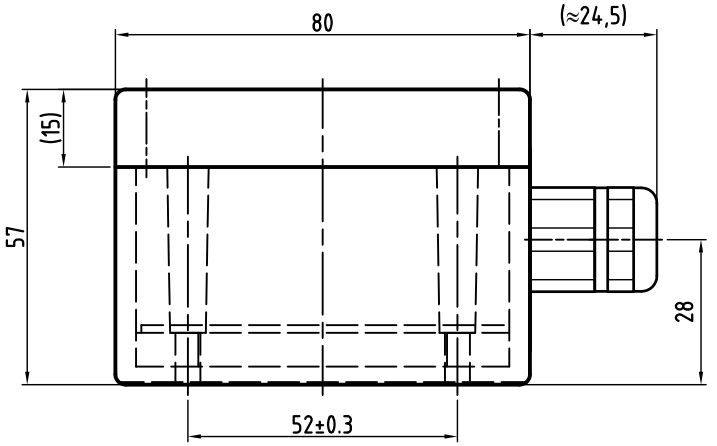
Ursprr./Orig:
Ers./Repl. for:
Ers. d./Repl. by:

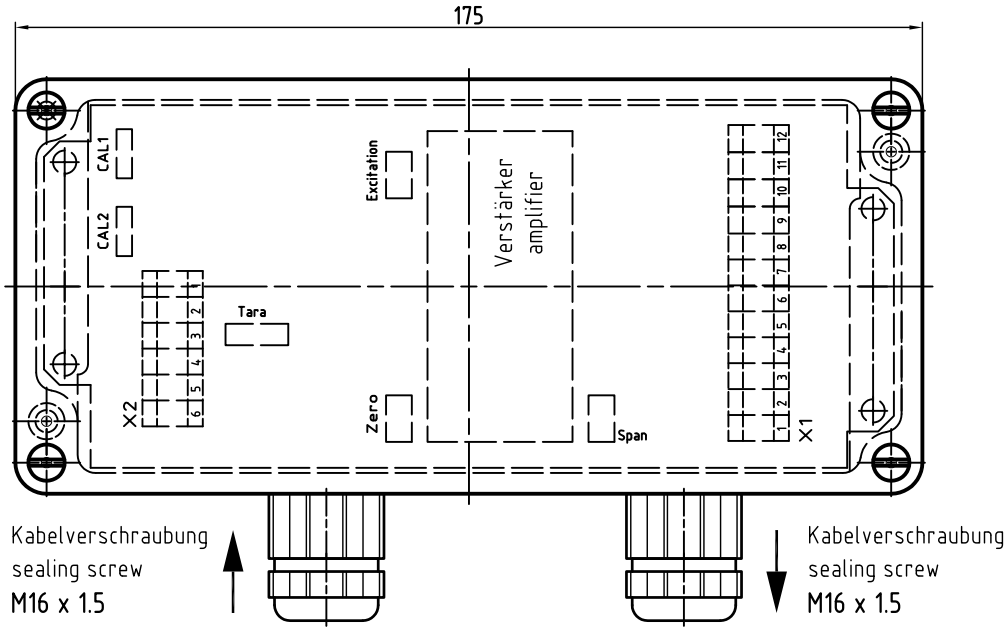
Zeichnungsnr.: E 30 391 04
Dwg.-no.:

Sh/Bl. Sh/Bl.

No. <>







Kabelverschraubung
sealing screw
M16 x 1.5

Kabelverschraubung
sealing screw
M16 x 1.5

Anschluss/connection
Messwertaufnehmer
transducer

Anschluss/connection
zur / to SPS

Verstärkertyp amplifier type	Ausgangs-Signal output signal
Y-Verstärker Y-amplifier	**0...20 mA**
Z-Verstärker Z-amplifier	**4...20 mA**

Pos. Pos.	Menge Quantity	Einheit Unit	Benennung Name	Zeichnungs-Nummer Drawing-no.	Werkstoff/Norm-Kurzbez./Bemerk. Material/Norm-name/Remark
4	1	Stck. pc.			
3	je 2	Stck. pc.	**Kabelverschraubung** **Sealilng screw**		M16x1,5-EMV; Ms
2	1	Stck. pc.	**Platine VV-B** **Circuit board VV-B**		LP1209-x
1	1	Stck. pc.	**Gehäuse** **Housing**	M 33 847 04	AlSi 12 (EMV)

Allgemeintoleranzen
DIN ISO 2768- **m**
General tolerances
DIN ISO 2768- **m**

Maßstab 1:1

Stehlager
pillow block:

Material: -
-

	Datum	Name
Bearb.	18.07.2018	Thierfeldt
Gepr.		
Norm		
Plot-date:		

Speise Mess Verstärker SMV
Voltage supply/meas. amplifier SMV
[(175 x 80 x 57) mm]

Dr. Brandt GmbH
info@strip-tension.com

Dwg.-no.: **M 34 429 03**

Blatt
Bl

Zust.	Änderungen	Datum	Name

Schutzvermerk DIN 34-1-D-E-F-I-R

Ers. f./repl. for:

Ers. d./repl. by:

Herstellererklärung / Konformitätserklärung

Hiermit erklärt die Firma Dr. Brandt GmbH, dass die von ihr hergestellten Betriebsmittel (Kraftmessgeräte) den grundlegenden Schutzanforderungen entspricht, die in der

Richtlinie 2014/30/EU (EMV-Richtlinie)

zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die Elektromagnetische Verträglichkeit festgelegt sind.

Zur Beurteilung der Erzeugnisse hinsichtlich der elektromagnetischen Verträglichkeit wurden folgende harmonisierte Normen herangezogen:

Störaussendung: EN 61000-6-4
Störfestigkeit: EN 61000-6-2

Die Maschinenrichtlinie 2006/42/EG findet für die Produkte (Kraftmessgeräte) der Firma Dr. Brandt keine Anwendung.

Beim Einbau dieser Produkte in Maschinen, die von der Anwendung dieser EG-Richtlinie betroffen sind, ist die Inbetriebnahme dieser Maschinen solange untersagt, bis festgestellt worden ist, dass die Maschinen den Bestimmungen der EG-Richtlinien 2006/42/EG entsprechen.

Manufacturer and Conformity Declaration

The Dr. Brandt Company declares, that all of their manufactured force measurement equipment are in conformity with the basic protection requirements, that are defined in the

Directive 2014/30/EC (EMI Directive)

for harmonizing the legal provisions of the member states on electromagnetic Compatibility are specified.

For the evaluation of the products regarding the electromagnetic compatibility the following harmonized standards are applied:

EMI-Emission: EN 61000-6-4
EMI-Immunity: EN 61000-6-2

The Machinery Directive 2006/42 / EC applies to the products (force measuring devices) from Dr. Brandt Company no application.

When installing these products in machines that are affected by the application of this EC directive, commissioning of these machines is prohibited until it has been determined that the machines comply with the provisions of the EC directives 2006/42 / EC.

Erkrath, 08/02/2021

Frederic Goronzy, Geschäftsführer / General Manager

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