Installation and Operational Instructions for EAS®- HTL housed clutch Sizes 02 – 3 Ratchetting, synchronous clutch (B.4.15.EN)

Translation of the Original Operational Instructions

Please read these Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions may lead to malfunctions or to clutch failure, resulting in damage to other parts.

Contents:

Safety and Guideline Signs

CAUTION

Danger of injury to personnel and damage to machines

Please Observe!
Guidelines on important points

Safety Regulations

These Installation and Operational Instructions (I + O) are part of the clutch delivery.
Please keep them handy and near to the clutch at all times.

It is forbidden to start initial operation of the product until you have ensured that all applicable EU directives and directives for the machine or system, into which the product has been installed, have been fulfilled.
At the time these Installation and Operational Instructions go to print, the EAS®-clutches accord with the known technical specifications and are operationally safe at the time of delivery.
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the ATEX directive.

CAUTION

- ❒ If the EAS®-clutches are modified.
- ❒ If the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust impacts or foreign body impact.
- ❒ The clutches may not be put into operation without an overload detection provided by the customer unless *mayr®* has been contacted and has agreed otherwise.

To prevent injury or damage, only specialist personnel are allowed to work on the components. They must be familiar with the dimensioning, transport, installation, initial operation, maintenance and disposal according to the relevant standards and regulations.
Please read the Installation and Operational Instructions carefully prior to installation and initial operation of the device.

These Safety Regulations are user hints only and may not be complete!

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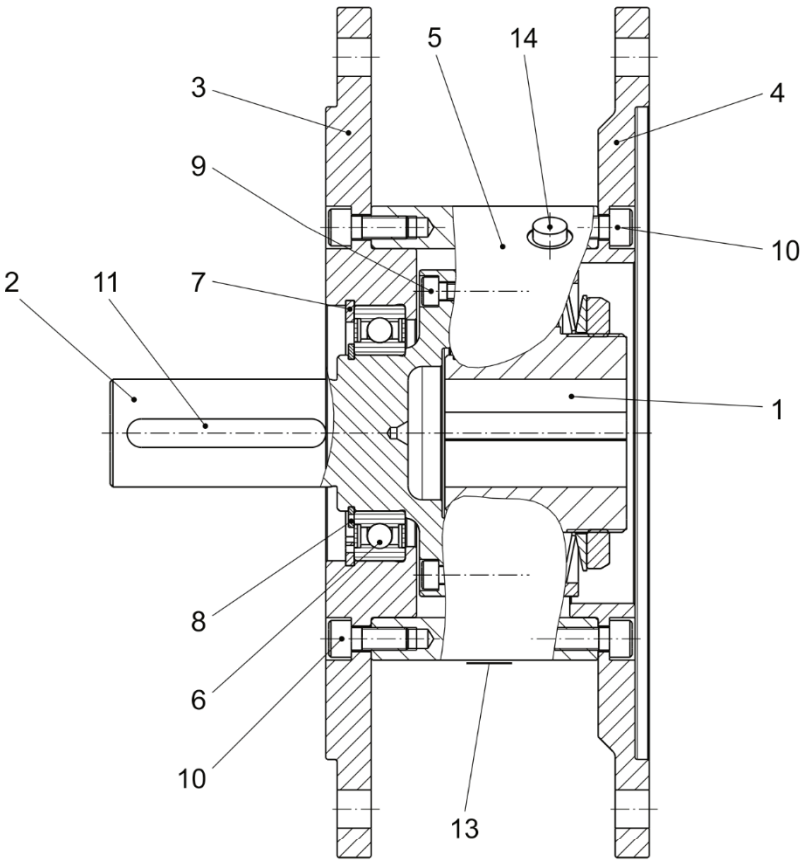

Fig. 1

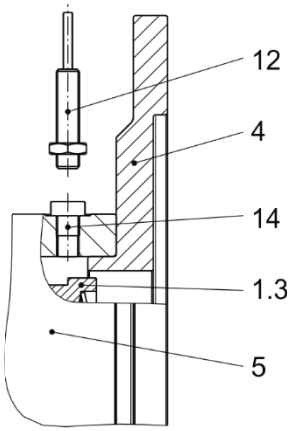

Fig. 1a

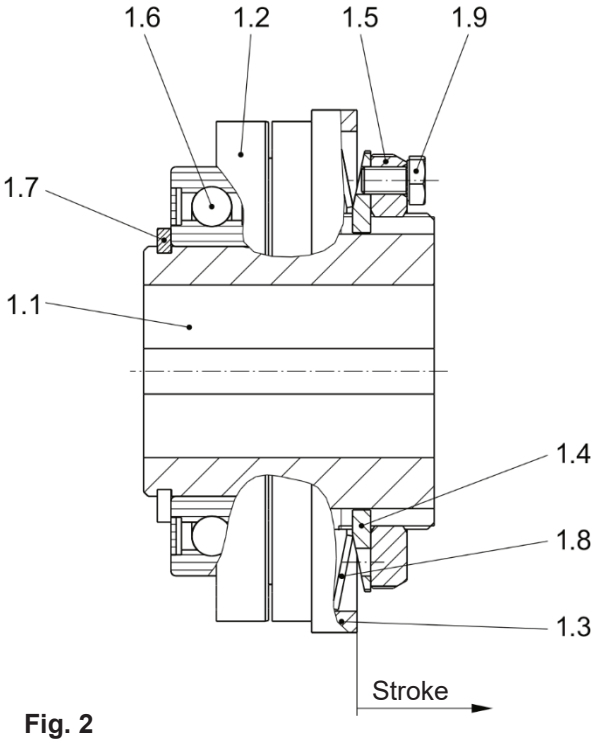

Fig. 2

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Parts List (Only use *mayr*® original parts)

Item	Name
1	EAS®-compact® overload clutch
1.1	Hub
1.2	Pressure flange
1.3	Thrust washer
1.4	Locking ring
1.5	Adjusting nut
1.6	Deep groove ball bearing DIN 625
1.7	Locking ring DIN 471
1.8	Cup spring
1.9	Screw

Item	Name
2	Output shaft
3	Output-side flange
4	Drive-side flange
5	Distance ring
6	Deep groove ball bearing DIN 625
7	Locking ring DIN 472
8	Locking ring DIN 471
9	Cap screw DIN EN ISO 4762
10	Cap screw DIN EN ISO 4762
11	Key DIN 6885/1
12	Limit switch
13	Type tag
14	Thread plug

Technical Data

Table 1

Size	Limit torques for overload M_G Type 4_0.52_.0 [Nm]	Type 4_0.62_.0 [Nm]	Type 4_0.72_.0 [Nm]	Max. speed [rpm]
02	2 – 5	5 – 10	6 – 15	4000
01	5 – 12.5	10 – 25	20 – 50	4000
0	10 – 25	20 – 50	40 – 100	3000
1	20 – 50	40 – 100	80 – 200	2500
2	40 – 100	80 – 200	160 – 400	2000
3	70 – 175	140 – 350	280 – 700	1500 [1]

[1] The max. speed is 1200 rpm for Type 4_0.7_ _._

Table 2

Size	Tightening torque Item 9 [Nm]	Tightening torque Item 10 [Nm]	Thrust washer stroke (Fig. 2; Item 1.3) on overload [mm]	Bore from – to [mm]
02	1.3	5	1.0	8 – 16
01	4.5	5	1.2	12 – 20
0	8.9	5	1.5	15 – 25
1	15.5	20	1.8	22 – 30
2	15.5	20	2.0	28 – 40
3	37	63	2.2	32 – 50

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Technical Data

Table 3

Clutch size	Motor size	Dimension h [mm]	Dimension h_2 [mm]	Maximum shaft length h_1 [mm]	Weight [kg]
02	**63**	23	23	35	3.6
02	**71**	30	30	36	4.2
01	**80**	40	40	52	8.2
0	**90**	50	50	63	9.8
1	**100**	60	60	79	16.6
2	**132**	80	80	93	23.5
3	**160**	110	110	126	34
3	**180**	110	110	126	37
01	**56C**	2.06"	2.06"	2.20"	6.8
01	**143TC**	2.12"	2.12"	2.20"	7
1	**184TC**	2.87"	2.87"	3.16"	18.3
2	**215TC**	3.37"	3.37"	3.43"	19.8
2	**256TC**	4.00"	4.00"	4.20"	19

Table 4: Max. Permitted Bearing Loads

Clutch size	Motor size	Axial forces [N]	Radial forces [N]	Transverse force torque B [1] (Fig. 3) referring to the clutch flange [Nm]	Transverse force torque C [2] (Fig. 3) referring to the housing [Nm]
02	**63**	100	200	2.5	35
02	**71**	100	200	2.5	76.5
01	**80**	200	400	5	318
0	**90**	300	600	10	495
1	**100**	350	700	20	765
2	**132**	350	700	30	1568
3	**160**	500	1000	40	1872
3	**180**	500	1000	40	2912
01	**56C**	100	200	5	318
01	**143TC**	200	400	5	318
1	**184TC**	350	700	20	995
2	**215TC**	350	700	30	995
2	**256TC**	350	700	30	995

[1] Value B indicates torques which put strain on the deep groove ball bearing due to the non-centric axial forces having an effect on the pressure flange.

[2] Value C refers to purely static loads. In case of oscillation or vibration occurrence, please use a safety factor of 2.5.

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Design

The EAS®-HTL clutch is a mechanically disengaging overload clutch, based on the ball detent principle. It is designed as a housed clutch (Protection IP53) for attachment to an IEC B5 flange according to DIN EN 50347 or a NEMA flange.
The connection dimensions are designed according to the motor sizes 63, 71, 80, 90, 100, 132, 160, 180, or 56C, 143TC, 184TC, 215TC and 256TC.
EAS®-HTL clutches as a complete unit provide overload protection between the motor and the gearbox.

Scope of Delivery / State of Delivery

- ❑ The clutch is manufacturer-assembled ready for installation.
- ❑ The torque is set manufacturer-side according to the customer's request (please compare the torque stipulated in the order with the torque imprinted/engraved in the identification).
  Unless the customer requests a particular torque setting when ordering, the clutch will be pre-set to approx. 70 % of the maximum torque.
- ❑ The limit switch has been adjusted as capable of function manufacturer-side.

Please check the scope of delivery according to the Parts List as well as the state of delivery immediately after receiving the goods. *mayr*® will take no responsibility for belated complaints.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects immediately to the manufacturer.

Function

The clutch protects the drive line from excessively high, unpermitted torque impacts which can occur due to unintentional blockages.

Function in normal operation
The EAS®-compact® clutch transmits the torque backlash-free from the motor shaft via the EAS®-compact® clutch (pressure flange Item 1.2) onto the output.
The torque transmission takes place backlash-free for the entire lifetime of the clutch.

Function in case of overload
If the set limit torque is exceeded (overload), the clutch disengages, the thrust washer (1.3) carries out an axial hub movement.
A signal is emitted via the integrated contactless limit switch (12), which can be used to shut down the entire system or machine.
The residual torque is approx. 5 to max. 15 % of the set torque.
This means that the EAS®-compact® clutch is not load holding.
Once the overload is removed, the clutch becomes automatically ready for operation again on reaching an engagement position.

Re-engagement:
The ratchetting division on the EAS® ratchetting clutch
Type 4_0._20._ is **15°**
The ratchetting division on the EAS® synchronous clutch
Type 4_0._25._ is **360°**

General Installation Guidelines

- ❒ **Important!**
  EAS®-HTL clutches do not compensate for shaft misalignments.
- ❒ Do not introduce radial / axial forces onto the clutch bearing due to component distortion.
- ❒ Minimum screw quality 8.8 for customer-side attachment.
- ❒ Please observe the max. permitted bearing loads acc. Table 4 on page 4.

The determination of the max. permitted bearing load is based on a nominal lifetime estimation of 32000 h according to the usual specifications provided by the bearing manufacturers.
Possible bearing distortion must be ruled out via temperature measurement on the housing in the deep groove ball bearing (6) area during initial operation: **ΔT ≤ 40 °C**
The steady-state temperature must be evaluated.

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Installation Preparations (Customer-side)

- ❑ Bore and shaft surface quality: Ra = 1.6 µm acc. DIN EN ISO 4287.
- ❑ Shaft material: Yield point at least 400 N/mm², e. g. St 60, St 70, C 45, C 60.
- ❑ Fit tolerance of the bore: F7
- ❑ Fit tolerance of the shaft: k6.
- ❑ Shape and position tolerances (flange geometry): Manufactured for clutch transmission part acc. Fig. 3.

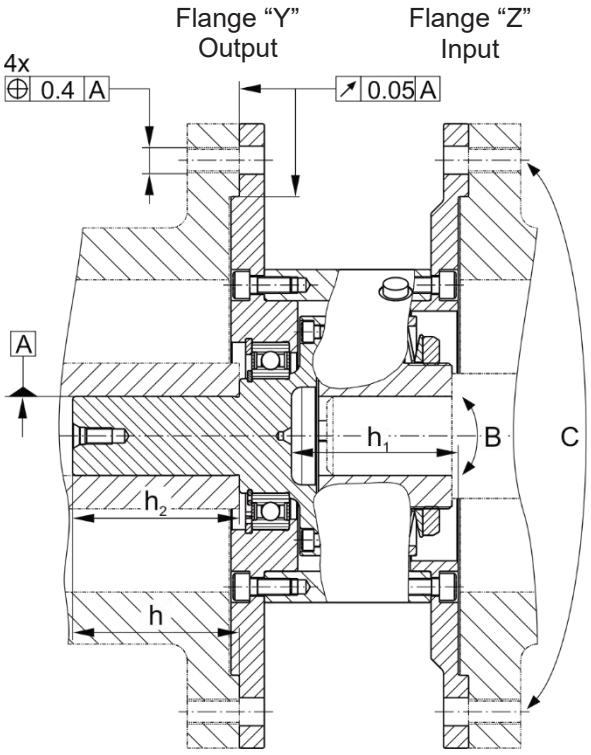

Fig. 3

Installation (Figs. 1 to 3)

- ❒ Insert the manufacturer-assembled and adjusted clutch in the customer bore or flange “Y”, turn it to the correct position (must align with the fixing threads) and bolt it together with the mounting part (flange “Y”) using 4 screws.

Please observe clutch dimensions h and h_2 (see Table 3 and Fig. 3).

- ❒ Insert flange “Z” with the shaft into the clutch hub bore (Item 1.1) or the flange inner centering (Item 4), turn it to the correct position (must align with the fixing holes) and bolt it together with the mounting part (flange “Z”) using 4 screws.

Please observe the maximum shaft length h_1 (see Table 3 and Fig. 3).

Torque Adjustment

The torque is set manufacturer-side according to the customer's request.

If the customer requires a torque setting or torque adjustment, please observe the supplied Installation and Operational Instructions for the integrated torque limiting clutch:
B.4.8.2.1. for Size 02, Type 450.-2-.0 or
B.4.14. for Sizes 01 to 3, Type 490.-2-.0

For this, the clutch must be removed from the housing.

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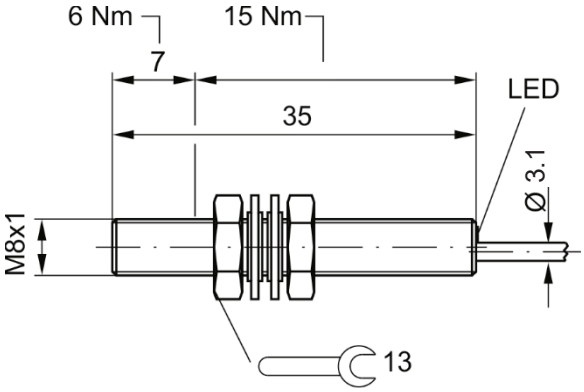
Contactless Limit Switch (Item 12, Fig. 1)

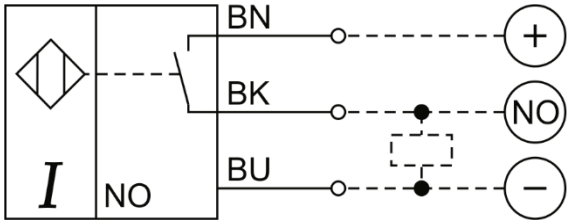
Technical Data

Switching element function	PNP NO contact
Real distance S_r:	1.5 mm ±10 %
Working distance S_a:	0 – 1.2 mm
Switching hysteresis H:	1 – 15 % of S_r
Reproducibility R:	≤ 5 % of S_r
Reproducibility R: (at a constant operating voltage and temperature)	± 0.01 mm
Ambient temperature T_a:	-25 °C / +70 °C
Temperature drift of the switch-on point:	≤ 10 % of S_r
Nominal voltage:	24 VDC
Operating voltage U_b:	10 V – 30 V
incl. residual ripple content SS:	≤ 15 %
Current carrying capacity I_a:	≤ 200 mA
Permitted load capacitance:	≤ 1.0 µF
Output resistance R_a:	1.9 + D + LED [kΩ]
Residual current I_r:	≤ 80 µA
Line voltage drop Uσ at I_a max. :	≤ 2.5 V
Switching frequency f:	≤ 1500 Hz
Own current consumption damped / undamped:	≤ 25 mA / ≤ 12 mA
Housing material:	Stainless steel
Ambient temperature	-25 ... 70 °C (248 ... 343 K)
Connection type:	LIFY-11Y.O / 3 x 0.14 mm²
Protection acc. DIN 40050:	IP67
Weight:	65 g

Detail Drawing



Wiring Diagram



Adjustment

The limit switch (PNP NO contact; Item 12) for the EAS®-HTL clutch has been adjusted and countered manufacturer-side. However, as the final clutch position is defined via the customer-side attachment, re-adjustment may be necessary.

This is carried out as follows:

- ❒ Loosen the counter nut on the limit switch.
  Screw in the limit switch up to its limit (limit switch damped).
- ❒ Unscrew the limit switch until it switches
  (limit switch undamped).
- ❒ Screw in the limit switch again carefully until it switches (limit switch is damped again), then continue for another 90°.
- ❒ Counter the limit switch.
- ❒ Check the switching function by disengaging the clutch.

In order to secure limit switch function, please keep it free from oil, grease and other dirt particles.

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Maintenance and Maintenance Intervals

The following maintenance and inspection intervals are to be maintained:

1.) **Before initial operation:**
- Visual inspection. Inspection of the installation parameters (tightening torques (see Table 2)) and the clutch running behavior
- Inspection for possible bearing distortions (see the Installation Guidelines on page 5 and Table 4)

2.) **After 5 to 10 operating hours:**
- Check the tightening torques produced

3.) **After 1000 h, at the latest after 3 months:**
- Visual inspection
- Inspection of the screw tightening torques.
  The specified tightening torques (see Table 2) must be maintained.
- Inspection of the misalignment and the clutch running behavior
- Inspection of the bearing or bearing pre-tension (temperature inspection/temperature monitoring)

4.) If no irregularities or wear are found during the maintenance and inspection interval defined in point 3.), further inspection intervals can, with unchanged operating parameters, take place **after 2000 operating hours, after 100 disengagements or after maximum 12 months.** The following work must be carried out:
- Visual inspection
- Functional inspection
- Inspection of the shaft-hub connection
- Inspection of the screw tightening torques
  The specified tightening torques (see Table 2) must be maintained.
- Inspection of the set torque
- Clutch release inspection
- Inspection of the bearing or bearing pre-tension (temperature inspection/temperature monitoring)
- Inspection of the misalignment and the clutch running behavior

We recommend that this maintenance work is carried out at the site of manufacture:
- Re-greasing of the transmission geometries, balls, recesses and sealing elements

Clutch re-greasing must only be carried out at the place of manufacture or by specially trained personnel.
For greasing, please use NLGI Class 1.5 grease with a basic oil viscosity of 460 mm^2/s at 40 °C, e.g. Mobilith SHC460.
When re-installing the clutch, please secure all screws with Loctite 243 (medium hard).
If large amounts of dirt or dust are present or in extreme ambient conditions, it may well be necessary to carry out inspections at shorter maintenance intervals.

If wear or damages are detected on the clutch in general, the affected components must be replaced immediately and the cause of the malfunction must be determined.

Causes of malfunctions could be:

a) Excessive misalignment
b) Excessive load (load alternations, start-up impacts, overload)
c) Ambient influences

Wear or damage on the clutch manifest themselves as:

a) Noise development
b) Troubled running behavior, vibration occurrences
c) Formation of cracks on the components
d) Warming
e) Loosening of the components
f) Friction tracks

Should any irregularities occur, the system must be stopped independently of imminent maintenance and inspection intervals, and the cause of the malfunction must be determined using the Malfunctions / Breakdowns Table.

Disposal

Electronic components (Limit switch):
Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

Steel components:
Steel scrap (Code No. 160117)

All aluminum components:
Non-ferrous metals (Code No. 160118)

Seals, O-rings, V-seals, elastomers:
Plastic (Code No. 160119)

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Malfunctions / Breakdowns

Malfunction	Possible Causes	Solutions
Premature clutch release	Incorrect torque adjustment	1) Set the system out of operation 2) Check the torque adjustment 3) Secure the adjusting nut 4) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
	Adjusting nut has changed position	
	Worn clutch	
Clutch does not release on overload	Incorrect torque adjustment	1) Set the system out of operation 2) Check the torque adjustment 3) Secure the adjusting nut 4) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
	Adjusting nut has changed position	
	Worn clutch	
Running noises in normal operation	Insufficient clutch securement	1) Set the system out of operation 2) Check the clutch securement 3) Check the screw tightening torques 4) Check the torque adjustment and that the adjusting nut sits securely
	Loosened screws	
	Loosened adjusting nut	

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