Installation and Operational Instructions for EAS®- HTL housed overload clutch Sizes 01 – 3 Type 490._24.0X

(B.4.15.1.ATEX.EN)

Design according to
Drawing number: individually attributed
Article number: individually attributed

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.
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.

The product must be specially marked for use in areas where there is a danger of explosion.
The product will only be marked if it is ordered especially for an Ex-area.

Contents:

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Safety and Guideline Signs

DANGER

Immediate and impending danger, which can lead to severe physical injuries or to death.

CAUTION

Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

Guidelines on explosion protection

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.

DANGER

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

The EAS®-clutch is permitted for use in areas where there is a danger of explosion.
For application in Ex-areas, please observe the special safety-related guidelines and directives on pages 10 and 11. The product must be especially marked for this area.
The product will only be marked if it is ordered especially for an Ex-area.

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust or foreign body impact.
- ❒ The clutches may not be put into operation without a limit switch (for Ex-areas) unless *mayr*® has been contacted and has agreed otherwise.

To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. 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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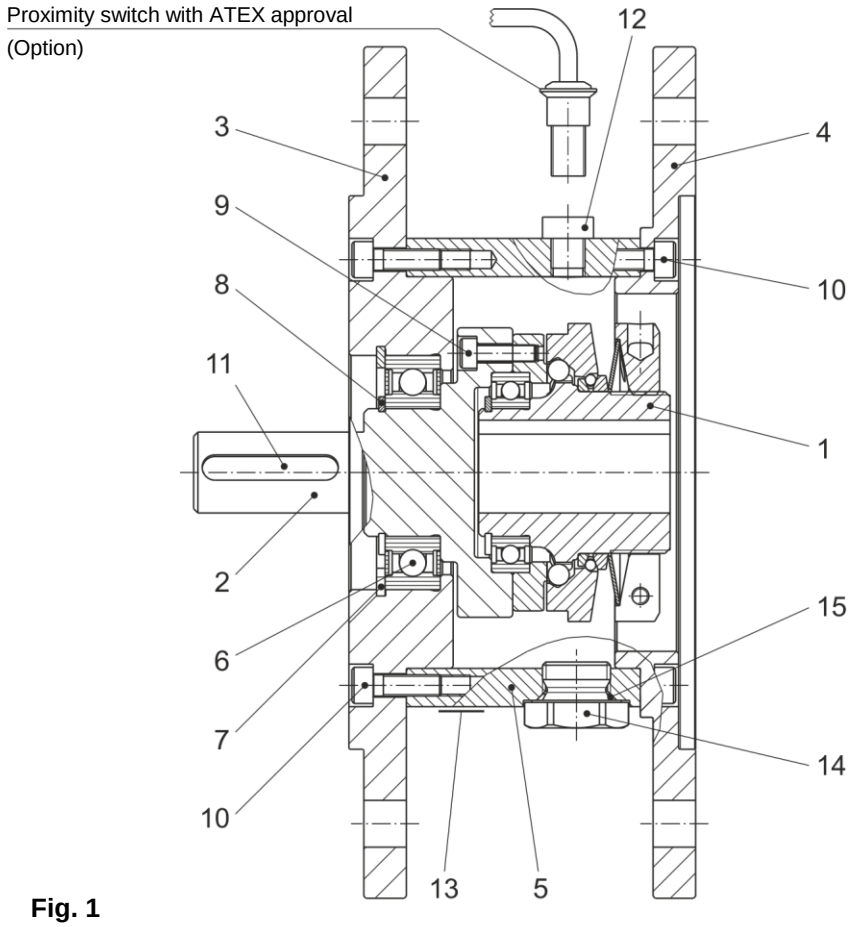

Fig. 1

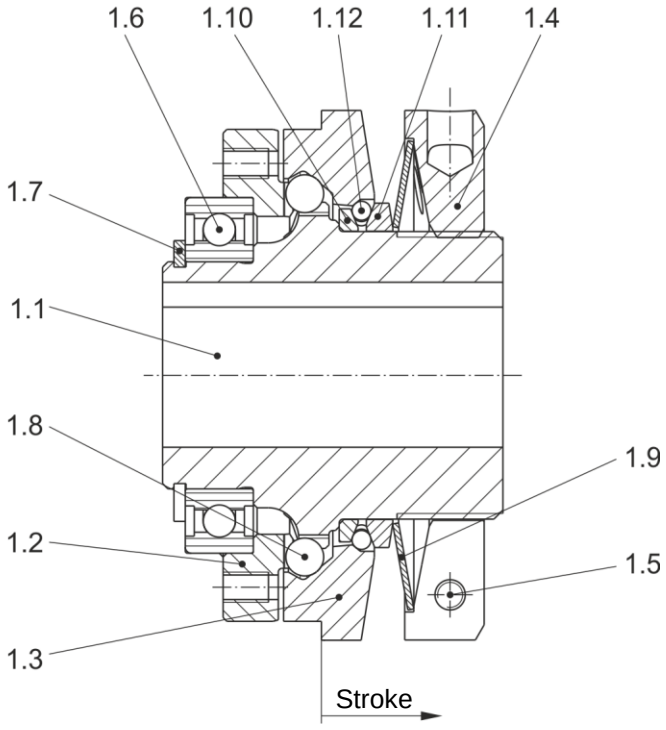

Fig. 2

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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	Adjusting nut
1.5	Cap screw DIN EN ISO 4762
1.6	Deep groove ball bearing DIN 625
1.7	Locking ring DIN 471
1.8	Steel ball DIN 5401
1.9	Cup spring
1.10	Supporting ring
1.11	Thrust ring
1.12	Steel ball DIN 5401
2	Output shaft
3	Output-side flange
4	Input-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	Thread plug
13	Type tag
14	Screw plug DIN 7604 (for re-engagement bore)
15	O-ring

Optionally, a limit switch with appropriate explosion protection certification is available.

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Technical Data

Table 1

Sizes	Limit torques for overload M_G Type 490.524.2 [Nm]	Type 490.624.2 [Nm]	Type 490.724.2 [Nm]	Type 490.824.2 [Nm]	Max. speed [rpm]
01	5 – 12.5	10 – 25	20 – 50	not	3000
0	10 – 25	20 – 50	40 – 100	permitted	3000
1	20 – 50	40 – 100	80 – 200	for	3000
2	40 – 100	80 – 200	160 – 400	ATEX	3000
3	80 – 200	160 – 400	320 – 800		3000

Table 2

Sizes	Tightening torque Item 1.5 [Nm]	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]
01	3	4.5	5	2.0	12 – 20
0	5	9.5	5	2.6	15 – 25
1	9	16	20	3.2	22 – 30
2	9	16	20	3.8	28 – 40
3	15	40	20	4.5	32 – 50

Table 3

Sizes	Type 49_.5_4._ Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 5) at approx. 70 % M_G [mm]	Type 49_.6_4._ Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 5) at approx. 70 % M_G [mm]	Type 49_.7_4._ Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 5) at approx. 70 % M_G [mm]	Type 49_.8_4._ Maximum torque M_G [Nm]	Inspection dimension "a" (Fig. 5) at approx. 70 % M_G [mm]
01	12.5	4.4	25	3.7	50	2.2	not	
0	25	4.7	50	3.8	100	1.8	permitted	
1	50	5.1	100	4.0	200	1.5	for	
2	100	6.6	200	5.3	400	2.5	ATEX	
3	200	5.0	400	3.1	800	-0.4		

Table 4

Clutch size	Motor size	Dimension h [mm]	Dimension h_2 [mm]	Maximum shaft length h_1 [mm]	Weight [kg]
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

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Table 5 (Screws for customer-side attachment onto the flange "Y" and flange "Z" with respective tightening torque)

Clutch size	Motor size	Screws with a strength class of 8.8 (number of pieces per flange)	Tightening torque
01	**80**	4 x M10	43 Nm
0	**90**	4 x M10	43 Nm
1	**100**	4 x M12	74 Nm
2	**132**	4 x M12	74 Nm
3	**160**	4 x M16	183 Nm
3	**180**	4 x M16	183 Nm
01	**56C**	4 x	Nm
01	**143TC**	4 x	Nm
1	**184TC**	4 x	Nm
2	**215TC**	4 x	Nm
2	**256TC**	4 x	Nm

Design

The EAS®-HTL overload clutch is designed as a mechanically disengaging overload clutch, based on the ball detent principle. It is designed as a housed clutch (Protection IP 53) 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 80, 90, 100, 132, 160, 180, or 56 C, 143 TC, 184 TC, 215 TC and 256 TC.
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.

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. After overload has taken place, the transmitting mechanism is completely disconnected. Only the bearing friction continues to have an effect.
This means that no re-engagement impacts or metallic sliding movements occur on the clutch torque transmission geometries when using this clutch variant.
In order to make the clutch ready for operation again after an overload occurrence, the clutch must be re-engaged.
When in operation, the set torque is transmitted backlash-free onto the output from the motor shaft via the EAS®-Compact® overload clutch (pressure flange (1.2)).
If the set limit torque is exceeded (overload), the clutch disengages and remains disengaged.

The input and the output are separated residual torque-free.
A signal is emitted via a mounted **limit switch with ATEX certification** (provided by the customer), which can be used to shut down the entire system or machine. Optionally, the limit switch can also be procured from *mayr*® with the clutch.
After-acting masses can run free.

CAUTION

After overload occurrence, the clutch has no load-holding function.

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 6 on page 11.

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 4287.
- ❑ Shaft material: Yield point at least 400 N/mm², e. g. St 60, St 70, C 45, C 60.
- ❑ Bore tolerance: F7
- ❑ Shaft tolerance: k6.
- ❑ Shape and position tolerances (flange geometry): Manufactured for clutch transmission part acc. Fig. 3.

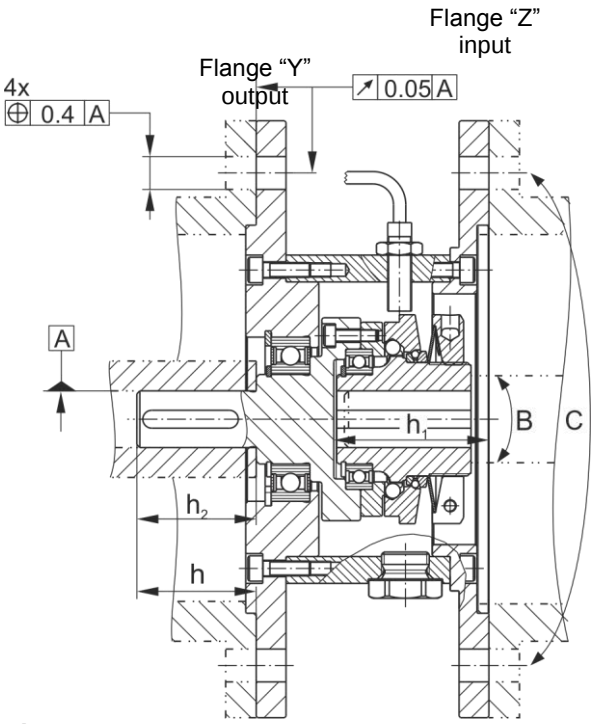

Fig. 3

Installation (Figs. 1 to 3)

- ❒ Join the manufacturer-assembled and adjusted clutch on the output side, turn it to the correct position (flange bores must align with the fixing threads) and bolt it together with the mounting part (flange "Y"). Please observe the attachment specifications indicated in Table 5.

Please observe clutch dimensions h and h_2 (see Table 4 and Fig. 3).

- ❒ Insert flange "Z" with the shaft into the clutch hub bore (Item 1.1) or in the flange inner centring (Item 4), turn it to the correct position (flange bores must align with the fixing holes) and bolt it together with the mounting part (flange "Z"). Please observe the attachment specifications indicated in Table 5.

Please observe the maximum shaft length h_1 (see Table 3 and Fig. 4).

Re-engagement (Fig. 4)

Please observe the information on the dangers of re-engagement in areas where there is a danger of explosion on page 10.

Re-engagement must only take place when the device is not running.

There are two bores (180° offset to one another) for manual clutch re-engagement. They are locked with screw plugs (14). In order to re-engage the clutch, at least one of the two screw plugs (14), including its O-ring (15), must be loosened and removed. EAS®-Compact® overload clutch re-engagement is carried out by applying axial pressure to the thrust washer (1.3) in the direction of the output (flange Y) using a suitable lever tool (Fig. 4). It may be necessary to turn slightly between the pressure flange (1.2) and the thrust washer (1.3).

Please make sure that the bore threads (for screw plugs Item 14) in the distance ring (5) are not damaged by the lever tool.

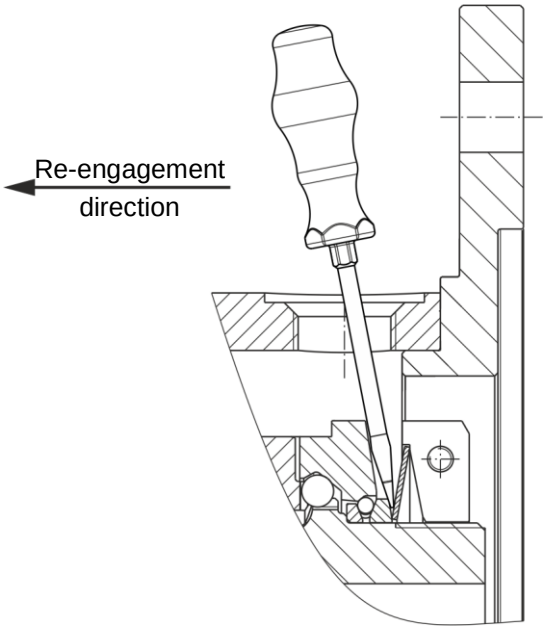

Fig. 4

After re-engagement has been completed successfully, the access bore must be re-closed using the screw plug (14) and the O-ring (15) placed under it.

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Torque Adjustment

The torque is set manufacturer-side according to the customer's request.
Torque adjustment is carried out by turning the adjusting nut (1.4). The installed cup springs (1.9) are operated in the negative range of the characteristic curve (see Fig. 7); this means that a stronger pre-tensioning of the cup spring results in a decrease of the spring force.
If no particular torque adjustment is requested customer-side, the clutch will always be **pre-set** and **marked** (calibrated) to approx. 70 % of the maximum torque.
It is possible to check the **"Spring operation in the operating range"** (Fig. 7) using the dimension "a" (distance from the adjusting nut (1.4) facing side to the hub (1.1) facing side, as shown in Fig. 5).
Please see Table 3 for the respective values.

Turning the adjusting nut (1.4) clockwise causes a reduction in torque.
Turning it anti-clockwise causes an increase in torque.
You should be facing the adjusting nut (1.4) as shown in Figs. 5 and 6.

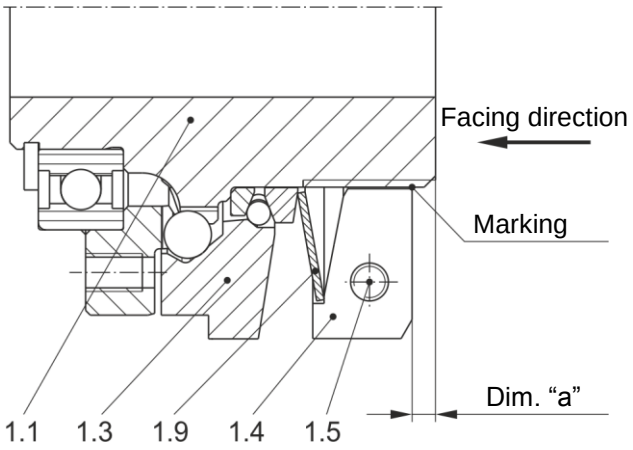

Fig. 5

Changing the Torque

a) Please convert the required torque using the formula below into percent of the maximum adjustment value (see Table 3).

$$\frac{\text{Required torque adjustment}}{\text{max. adjustment value}} \times 100 = \text{Adjustment in \%}$$

b) Loosen the locking screw (1.5) in the adjusting nut (1.4).

c) Turn the adjusting nut (1.4) clockwise or anti-clockwise according to the engraved adjustment scale (Fig. 6) using a hook wrench or a face wrench, until the required torque is set.

d) The required torque results from the marking overlap on the hub (1.1) and the percent value on the adjusting nut (Item 1.4 / Figs. 5 and 6).

e) Tighten the locking screw (1.5) again
(please observe the tightening torque acc. Table 2).

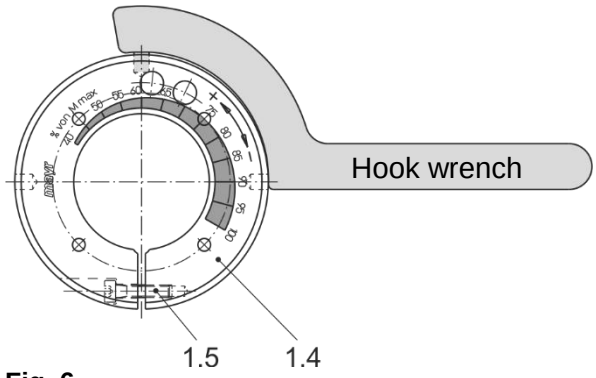

Fig. 6

Adjusting the adjusting nut (1.4) or distorting the cup spring (1.9) outside of the cup spring characteristic curve (see Fig. 7) stops the clutch functioning.
The inspection dimension "a" (see Table 3) can show deviations due to construction tolerances or to clutch wear.

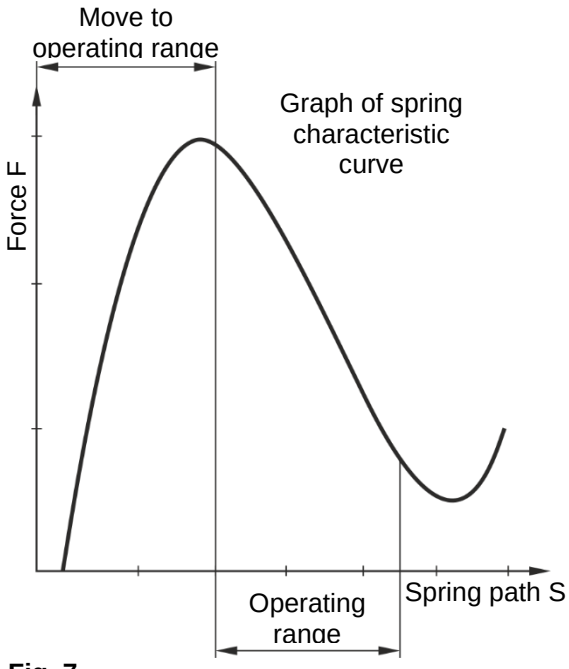

Fig. 7

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Limit Switch

In order to limit run-out times after overload has taken place, a limit switch must be mounted onto the overload clutch.
For this, please remove the thread plug (12) and attach the limit switch to the thread M8 x 1.
Limit switches with appropriate explosion protection certification are suitable.
Grinding, mechanically actuated limit switches are only permitted for application in areas where there is a danger of explosion if it can be proved that there is no danger of ignition caused by the grinding movement of the mechanical limit switch on the clutch.
The contactless limit switch is to be mounted onto the switching edge of the clutch (Fig. 8) so that no signal changes are caused during normal operation on the limit switch by the usual clutch run-out errors.
In case of overload, the thrust washer (1.3) carries out a stroke in the direction of the adjusting nut (1.4), see Figs. 2 and 8, which is used to change the signal on the limit switch. The signal change should take place at the latest after an axial thrust washer (1.3) stroke of 0,5 mm. At the same time, please maintain a radial minimum distance of 0.5 mm in order to prevent rubbing of the contactless limit switch, meaning a danger of ignition.

ATEX-appropriate elements must be used for energisation and switching amplification of the limit switch.

Limit Switch Installation

Adjust the switch distance for the contactless Ex-limit switch acc. Fig. 8.

Contactless limit switch (mounting example)

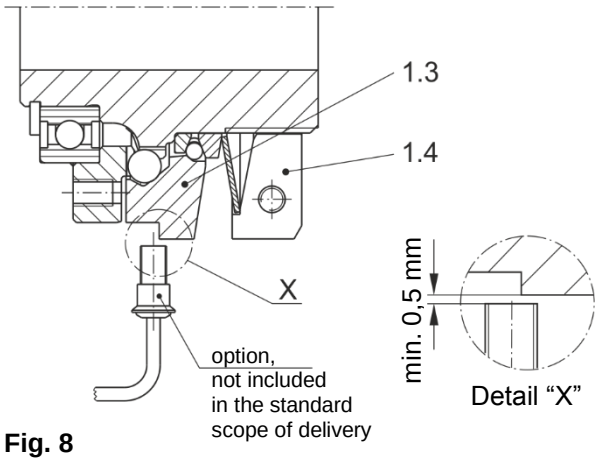

Fig. 8

The correct proximity switch adjustment must be checked and guaranteed by manually disengaging the overload clutch.
In order to secure limit switch function, please keep it free from oil, grease and other dirt particles.

Design with Integrated Limit Switch (Option)

Please observe the included Operational Instructions for the limit switch.

The optional limit switch is equipped with the appropriate explosion protection certification.

Limit Switch Adjustment

The EAS®-HTL clutch limit switch (NO contact or NC contact) is adjusted and countered manufacturer-side. However, as the final clutch position is defined via the customer-side attachment, re-adjustment may be necessary.

CAUTION

If the limit switch is installed as a NC contact, limit switch failure will not be recognised due to cable breakage.

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.
- ❒ The correct proximity switch adjustment must be checked and guaranteed by manually disengaging the overload clutch.

Maintenance

The EAS®-HTL clutches are mainly maintenance-free. Special maintenance work may be necessary, however, if the device is subject to large amounts of dirt or dust or is operating in extreme ambient conditions.
Please see Maintenance and Inspection Intervals for Clutches in Areas Where There is a Danger of Explosion.

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.

All steel components:
Steel scrap (Code No. 160117)

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

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

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(B.4.15.1.ATEX.EN)

Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

Classification of Ex Areas Where There is a Danger of Explosion and Permitted Types

Torque transmission via a key connection acc. DIN 6885/1:

Dimensioning according to the requirements shaft diameter, transmittable torque and operating conditions must be carried out. For this, the corresponding user data must be known or the customer must carry out the dimensioning according to the valid calculation basis DIN 6892.
For the calculation, a hub (1.1) quality of Re = 400 N/mm^2 should be used.
For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered.
During initial operation, check whether the key is inserted correctly and whether the clutch is secured axially.
According to the described clutch combinations and if the measures and guidelines described in the Installation and Operational Instructions are observed, the EAS®-Compact® overload clutch (1) is suitable for use in areas where there is a danger of explosion according to the category:

CE Ex II 2G c T5 –15°C≤Ta≤+80°C D110°C

Conditions to Observe in Ex Areas Where There is a Danger of Explosion

For malfunction-free clutch operation, it is necessary to keep to the clutch characteristic values (Technical Data) indicated on pages 5/6 and in the catalogue.

Clutch dimensioning:

A suitable adjustment factor (service factor) is required so that the clutch can protect the drive line from overload without excessive wear over a long lifetime. The service factor is the relationship between the maximum load torque on the system in normal operation and the set clutch torque. This factor must be at least 1.5 and is selected depending on the complex of loads acting on the system. Adjustment factors of up to 3 may be necessary for very severe impacts and load peaks or alternating loads.
Regular functional inspections on the clutch (see Maintenance Intervals) confirm the functioning, unworn condition of the clutch. Wear on the clutch can lead to changes in the switch-off torque, or even to clutch blockage.
On overload, the clutch run-out times must be limited via a limit switch capable of recognising a clutch overload occurrence (usually with an inductive proximity switch for Ex-areas). Max. permitted run-out time: 3 minutes, with reference to an average speed of 3000 rpm. After overload has been registered, the sensor must emit a signal to stop the drive line. The blockage or malfunction must be removed.

CAUTION

Operation outside of the indicated characteristic data is not permitted. There is a danger of clutch destruction and of ignition.

Torque Adjustment:

The clutch must only be adjusted within the specified torque range. The torque range is defined through the adjustment dimension “a” from 40 % to 100 %.
If the clutch is set outside of the permitted adjustment range, it is possible that the clutch will not actuate in case of overload. This means that the overload protection will be blocked. This does not mean that the clutch can directly cause ignition. However, if the system torque increases to an unpermitted value, component breakage can be expected.
The user must ensure via simulated disengagement of the clutch before initial operation that the clutch actuates at the required torque value after torque adjustment or torque changes have taken place.

CAUTION

Danger of ignition!

Re-engagement

Attention: Impacts using metal tools made of steel or aluminium are not to be used for re-engagement, as there is a danger of impact sparks. Tools made of plastic or bronze are suitable. Please observe the danger of electrostatic charging when using plastic tools. In general, please observe the Guidelines in EN 1127-1. When using an automatic re-engagement mechanism, a locking device must be provided which guarantees free stroke on the thrust washer (1.3) in case of overload, even if re-engagement is actuated. Interfering contours which prevent the thrust washer (1.3) from disengaging or which are mounted especially for this purpose are not permitted. Free rotation of the clutch and free movement of the clutch components must be ensured before initial operation.

CAUTION

Danger of ignition!

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Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

Initial Operation

The phosphate coating serves as surface protection for the clutch. The clutch must only be used in areas protected from the weather. Additional corrosion protection is required for use in the open air or if the device is subject to weather conditions.
Severely corroded clutch components mean a danger of ignition.
The functional components of the clutch must not be stuck together due to paint coatings or other sticky media, and electrostatic charges must not be caused (see EN 13463-1 7.4).
A functional inspection must be carried out before initial operation.
The penetration of dirt or dust influences the grease condition of the clutch and therefore its lifetime. Organic dust binds the grease filling and the lubrication qualities of the grease are lost.

Operation in dust layers or in piles of dust is not permitted.

Only minor radial and axial forces or transverse force torques are permitted to be transferred onto the clutch bearing (Table 6).

Modifications of the clutch are not permitted. This also refers to changes to the cup spring layering.

Maintenance and Inspection Intervals for Clutches in Ex Areas Where There is a Danger of Explosion

The maintenance intervals refer to the set clutch torque inspections, shaft-hub connection inspections and screw tightening torque inspections. Please keep to the tightening torques specified on page 5. Clutch re-greasing must only be carried out by specially trained personnel and is only necessary in extreme operating conditions such as heavy dust, dirt or very high operating speeds. In these cases, the ball transmission geometries must be re-greased.

The following maintenance and inspection intervals are to be maintained:

1.) Visual inspections, installation parameter inspection (tightening torques), clutch running behaviour, clutch release, set torque, possible bearing distortions (temperature measurement on the housing in the deep groove ball bearing (6) area
⇒ ΔT ≤ 40 °C)
before initial operation.

2.) Visual inspection, tightening torque inspection, clutch release inspection, torque inspection and, if necessary, re-greasing
after 2000 hours, after 100 overload occurrences or at the latest every 6 months.

CAUTION

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.

Table 6: 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]
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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Malfunctions / Breakdowns

Error	Possible Causes	Danger Guidelines for Ex Areas	Solutions
Premature clutch release	Incorrect torque adjustment Adjusting nut has changed position (position) Worn clutch	None	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
Clutch does not release on overload	Incorrect torque adjustment Adjusting nut has changed position (position) Disengagement mechanism blocked by a foreign body Worn clutch	Danger of component destruction and related danger of ignition	1) Set the system out of operation 2) Check whether foreign bodies influence the disengagement mechanism function 3) Check the torque adjustment 4) Secure the adjusting nut 5) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
Running noises on overload occurrence as clutch slows down	Bearing on output flange is worn or has been previously damaged Housing bearing is worn or has been previously damaged Worn disengagement mechanism	Bearing heat-up to bearing destruction Danger of ignition	1) Set the system out of operation 2) Inspect the clutch at the place of manufacture
Running noises in normal operation	Insufficient clutch securement Loosened screws Loosened adjusting nut	Danger of ignition	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

mayr ® will take no responsibility or guarantee for replacement parts and accessories which have not been delivered by *mayr* ®, or for damage resulting from the use of these products.

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EU Declaration of Conformity

According to the EU Directive on the harmonisation of the laws of the Member States concerning devices and protective systems intended for use in areas where there is a danger of explosion (ATEX) 2014/34/EU, we:

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hereby declare that the product described in these Installation and Operational Instructions

EAS®-HTL overload clutch
Type 490._24.0X
Sizes 01, 0, 1, 2, 3

has been developed, constructed and produced by us in accordance with the EU Directive named above.

Applied Standards, Regulations and Inspections (ANVP)

1 DIN EN 1127-1: 2011-10
Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

2 DIN EN 13463-1: 2009-07
Non-electrical equipment intended for use in potentially explosive atmospheres - Part 1: Basic method and requirements

3 DIN EN 13463-5: 2011-10
Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety “c”

Mauerstetten, January 12, 2017
Place / Date

Graduate Engineer (FH, University of Applied Science) Günther Klingler
(Managing Director ppa.)

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