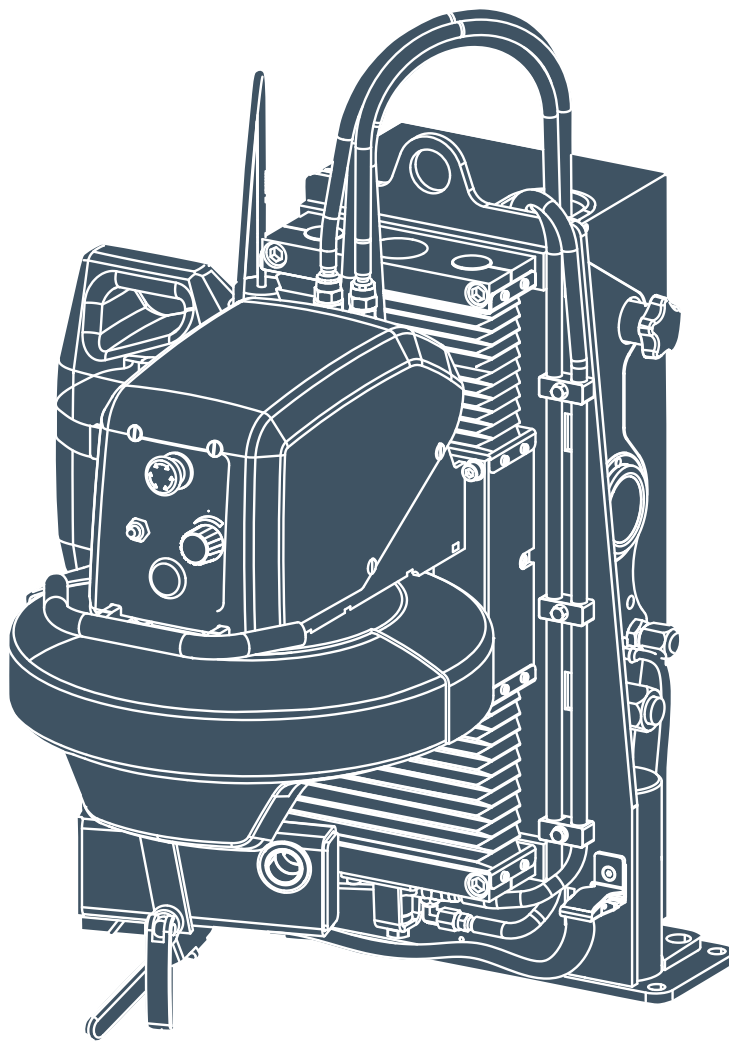


Grind Matic RH3 grinding machine



Operator's instructions
Spare parts list



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Before using the machine, read the operator's instructions carefully and then put them in a safe place for future reference.



It can be dangerous to use the machine if the care and maintenance instructions are not followed carefully.



Electricity.



Emergency STOP.



Risk of crushing.

Always replace damaged or illegible signs.

Safety instructions

Before using the machine, read through these instructions carefully.

- Important safety information is given at various points in these instructions.
- Special attention must be paid to the safety information contained in frames and accompanied by a warning symbol (triangle) and a "signal word", as shown below:



DANGER

Indicates an immediate risk that **WILL** result in serious injury or death if the warning is not observed.



WARNING

Indicates hazards or hazardous procedures which **COULD** result in serious injury or death if the warning is not observed.



CAUTION

- Indicates hazards or hazardous procedures which **COULD** result in injury or damage to equipment if the caution is not observed.
- Use approved spare parts only. Any damage or malfunction that can be attributed to the use of unauthorized spare parts is not covered by the machine warranty and invalidates product liability.

Also observe following general safety instructions:

- Make sure that there are no other personnel close to the grinding machine while grinding is in progress.
- Always wear goggles, protective clothing, steel toe safety shoes, gloves and hearing protection during grinding and handling of grinding bits. Any local regulations must also be observed.
- Wear an approved dust mask or arrange an effective dust-extraction system. This is especially important when grinding indoors.
- The machine must not be used for any purpose other than that for which it is intended. See "Applications".
- The machine must not be modified without the permission of the manufacturer. Modifications not approved by Epiroc Drilling Tools can incur the risk of serious injury to yourself and others.
- Before intervening in the oil or electrical systems, make sure there is no pressure in the oil system and that the electrical system is shut down.
- Beware of the risk of fire and explosion that could be initiated by sparks from the grinding work.
- Before using the machine, visually check the hoses and electric wiring for any damage. If any visible damage is detected, replace before using machine.
- Do not use the grinder when there is risk of: seismic event, lightning or hydraulic hose burst.
- If lifting equipment is used, make sure it's approved for its purpose.
- The splash guards supplied together with the machine must be used during grinding.

Technical data

Specifications	
Max. distance between bit holder and grinding wheel	230 mm
Drill bit diameters	35-165 mm
Max. grip size	110 mm
Min. distance between buttons	3,5 mm
Rec. oil pressure, min-max	150-260 bar
Oil consumption	13 l/min
Cooling liquid consumption	max 20 l/h
Voltage	24 VDC
Current	6 A
IP class	65
Working temperature	-25°C – +50°C
Speed, spindle	10 500 rpm
Weight	85 kg
Sound pressure during grinding*	85 dB (A)
Sound power level during grinding**	95 dB (A)
Vibration level during grinding***	< 2,5 m/s ²

Manufactured by Epiroc Drilling Tools AB, Fagersta, Sweden.

*Equivalent continuous A-weighted sound pressure level measured at operator's ear level during grinding. Possible spread due to measuring method and production factors: 3 dB(A).

**Sound power level established in accordance with EN 61029-1. Possible spread due to measuring method and production factors: 3 dB(A). Average value for frequency range 100-6300 Hz.

***Vibration measurement according to EN 61029-1.

General

The Grind Matic RH3 is fully hydraulic powered and designed to be attached to a drill rig. It grinds cemented carbide buttons and the surrounding body steel in the same operation using a diamond coated grinding wheel. The machine has an automatic feeding device, which makes it simple to use.

Applications

The Grind Matic RH3 is intended for grinding threaded and tapered button bits up to 127 mm in diameter and DTH and COPROD bits up to 165 mm (and shaft sizes up to 110 mm), and has a high grinding capacity.

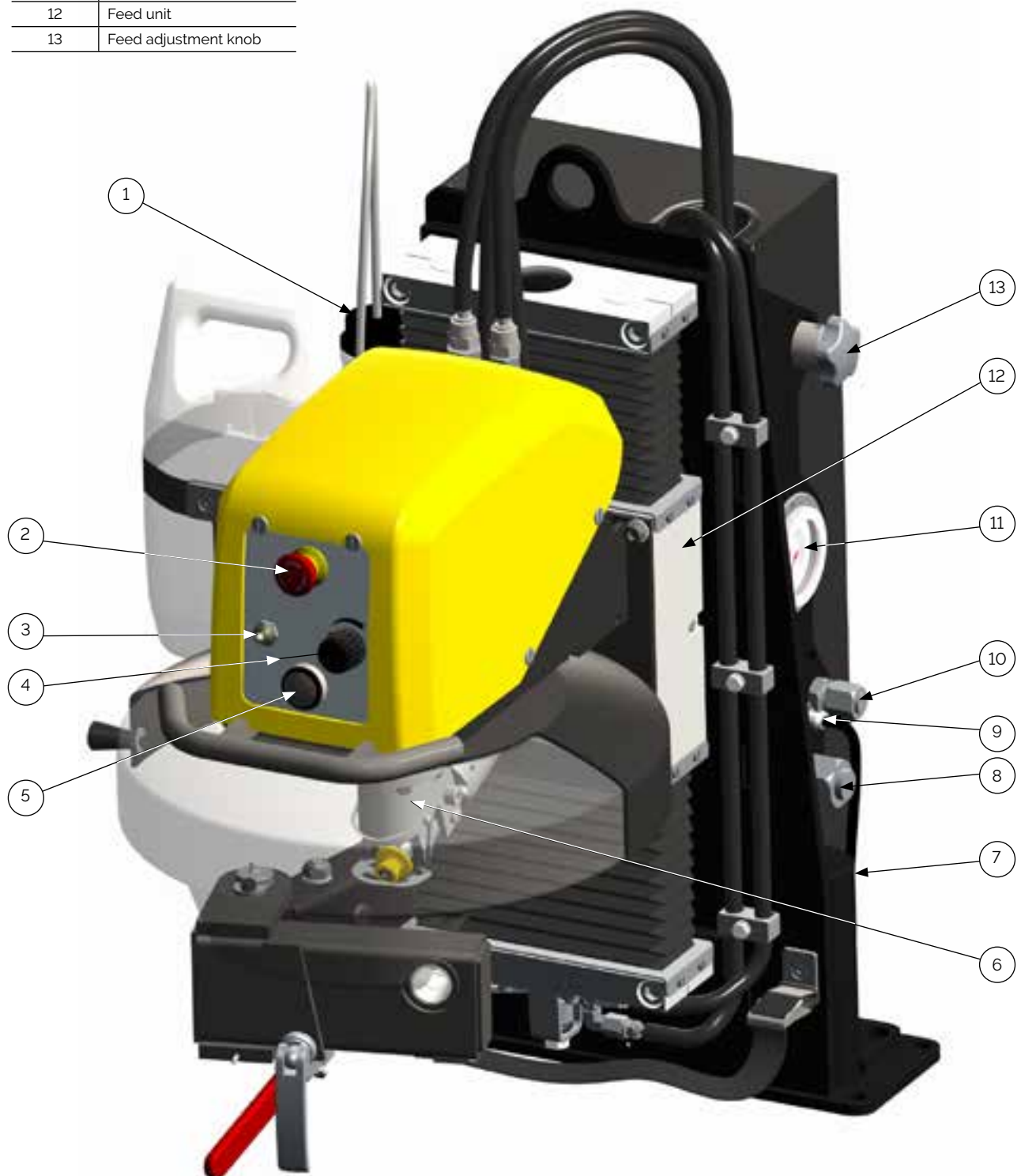
Technical description

The grinding machine Grind Matic RH3 consists principally of the following component assemblies:

- A frame attached to a feed unit.
- A rotation unit with a head and orbital motor, combined with a grinding spindle and a second motor.
- A hydraulic valve unit inside the back cover.
- A control panel is mounted in the front of the frame.
- A box with the electrical components.
- A coolant pump with a tank. Use water as coolant medium. Add anti-freeze liquid to prevent from freezing.
- A local emergency stop: The emergency stop function does not deactivate the drill rig, only the grinding machine. When resetting the grinding machine's emergency stop, the orbital movement will continue to it's starting position.
- An arm unit, holding the main bit holder. Also used to set the bit angle.
- A main bit holder to position the drill bit. Two different designs available.

Controls and other parts

Ref. No.	Description
1	Coolant
2	Emergency stop
3	Start/stop
4	Grinding time
5	Centering/feed
6	Grinding spindle
7	Electric box
8	Hydraulic return
9	Electric supply
10	Hydraulic inlet
11	Feed pressure gauge
12	Feed unit
13	Feed adjustment knob



General instructions

To maintain the optimal machine quality over time:

- Use original spare parts only.
- Read the maintenance instructions carefully before using the machine.
- Keep the machine clean.
- Check the water cooling level and function regularly.
- Electricity supplies must always be disconnected during installation, servicing and moving of the machine.
- If the machine is not going to be used for a long time, make sure that it is lubricated and cleaned before being left idle.
- Serial number can be found on the machine ID (left side of the frame).

Installation

WARNING

- Always follow the safety instructions with regard to installation, operation and maintenance.

Unpack and assembly

There is a lifting eye on the upper part of the frame. Always make use of the lifting eye when hoisting the machine into place. The weight of the machine is normally 85 kg. Make sure valid lifting equipment is used.



Example of assembly with Epiroc Drilling Tools rig bracket (Product No. 87005205).

The machine is designed with a bolt on concept, which make several installation options possible.

Electricity

The grinding machine comes with about 7 m electric wire and a fuse holder. When installing the electric wiring we strongly recommend to connect the positive (+) wire to position 87 on the relay (controlled by start key on the rig) or connect an optional switch for the grinder on the rig. Negative (-) wire can be connected to ground.

The extra inline fuse holder is recommended to be installed as closed as possible to the positive (+) supply.

WARNING

- Electrical connection of the machine is restricted to qualified electricians only, be sure to always observe local regulations in respect of electrical connection.
- Check that the electrical data for the machine is compatible with the mains voltage.

The emergency stop does NOT effect the rig functions if used. It's only connected to the grinding machine.

Hydraulics

Hydraulic hoses is not delivered with the grinding machine. Recommended hose sizes $\frac{3}{8}$ " on pressure side and $\frac{3}{4}$ " on return side.

When installing the hydraulic hoses we strongly recommend you to add the oil filter 87004952, between the rig and the pressure inlet. This to ensure highest possible oil quality to the grinding machine.

Note! Specially important in low temperature enviroments. (See rig specifications, section Hydraulic oil filter). Many rig oil filters are bypassed at lower temperatures.

CAUTION

- The maximum permissible working oil pressure for the grinding machine with hydraulic components is 260 bar.
- Visually inspect the hoses for any type of damage before use of the grinding machine.

Recommended oil types

< 50 °C	ISO-32
50-60 °C	ISO-46
60-70 °C	ISO-68

If replacing valves 87005258 or 87005045, note flow direction.

Grinding wheel

CAUTION

- The grinding wheel is hot immediately after grinding. Take care not to burn your fingers when changing the grinding wheel.



Fit the grinding wheel to the grinding spindle.

The small side of the grinding wheel must face the front of the spindle, where the screw is fitted. Make sure that the axle of the spindle is clean and lightly oiled. This will make it easier to remove the grinding wheel. Do not tighten the screw too hard.

If the grinding wheel cannot be removed using hand force only, make use of the extractor supplied with the machine.

CAUTION

Do NOT use impact or excessive force on the spindle or grinding wheel!

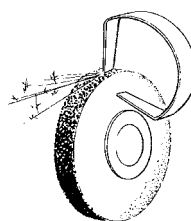
Centering finger

Assembly instruction

Centering fingers must be mounted after the grinding wheel is installed. You might also need to rotate the spindle to a position when the spindle grooves are in line.



Gently press the centering fingers up in to the slot until you hear a click.



Centering fingers comes in different original sizes (Small, Medium and Large) to fit many different button sizes. Still some adjustments might be needed.

When determining a suitable gap between the centring fingers, the wear pattern on the drill bit should be taken into consideration. It is sometimes necessary to proceed through trial and error.

Cooling

The drill bit and grinding wheel are cooled with water. Cooling water is switched on automatically when the timer is activated. Water is sprayed over the whole of the grinding wheel.

Cooling is very important to the service life of the grinding wheel and to the grinding result. If cooling is poor, thermal stresses can be ground into the cemented carbide button, with subsequent button breakage as a result. The service life of the grinding wheel falls dramatically if cooling is poor. Always follow safety instructions when handling cooling liquids.

Bit holders

A bit holder must be assembled to the grinding machine's arm unit. There are two designs; Multi Grup, which is suitable to all bit designs, Tophammer, COPROD and DTH.

The second bit holder is for Tophammer only and has to be completed with a second holder based on the used thread system.

Use the machine

How to manually set up the machine:

- Feed pressure is adjusted by the star knob at right hand side of the grinding machine. The feed pressure is shown at the gauge just below the star knob.
- Set grinding time by adjusting the timer on the control panel. Start with a short time to test if the result is good.
- Make a centering test at start-up to ensure you get a good centering result.
- The centering fingers delivered with the machine fits different button sizes. See section Installation.

User instructions

With the Grind Matic RH3, grinding is performed with an automatic feeding with preset bit grinding time.

CAUTION

The centre line of the button must be vertical during grinding.

1. Mount the bit to be grounded to the bit holder.
2. Press and hold the centering button on the control panel. Move one button into position below the grinding wheel and centering fingers.
3. Preset the grinding time by adjusting the timer on the control panel.
4. Activate the grinding operation by moving the start switch on the control panel to the start position.
5. Stop the grinding operation by moving the start switch on the control panel to the stop positin, or wait until the timer has finished.

For optimal grinding results and wheel performance:

- Centralize the buttons precisely.
- Make sure there is a generous flow of coolant at the point of contact.
- Grind carefully and do not rush.
- Do not try to speed up the grinding by adding hand pressure to the feed lever.
- Use original grinding wheels only.
- Adjust the centering fingers to get a good centering result. You might have to cut/bend the centering fingers depending on the size of the button and wear of your equipment.

CAUTION

The manufacturer disclaims all responsibility for any problems (or consequences thereof) attributable to the use of non-original grinding wheels.

Grinding

DANGER

- Always check that there are no traces of explosive in the flushing holes of the drill bit. To clean out the flushing holes, ONLY a wooden stick, a length of copper wire or flushing water may be used.
- Beware of the risks of fire or explosion that might be initiated by sparks from the grinding work.

CAUTION



- Never remove the grinding guard from the machine.
- Make sure that the grinding station or place of work is well ventilated.
- Always wear goggles, protective clothing, steel toe safety shoes, gloves, dust mask and hearing protection during grinding.
- The grinding wheel is hot immediately after grinding. Take care not to burn your fingers when changing the grinding wheel.
- To prevent injuries caused by crushing, avoid moving parts when the machine is running.

General rules

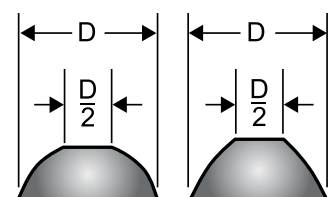
Adequate cooling is crucial to the service life of the grinding wheel, and also to the grinding result. Poor cooling can result in heat stresses being "ground into" the cemented carbide buttons, with button fracture as a result. The service life of the grinding wheel falls dramatically if cooling is poor.

Pressing the grinding wheel too hard on to the cemented carbide button will reduce the service life of the wheel. Both the grinding wheel and the cemented carbide button can be damaged by excessive heat generation. A new grinding wheel must always be "run in". Start grinding carefully and increase the feed pressure gradually. This practice will increase the service life of the grinding wheel substantially.

Grinding hints

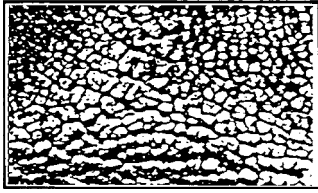
The rate of bit wear depends on the rock formation, and is highest in rocks with a high quartz content. A suitable grinding interval should be determined according to the rate of bit wear. It is more economical to regrind too early rather than to suffer poor penetration rates and risk damaging the drill bit through overdrilling. A few hints about the care of drill bits:

When to regrind



Button bits should be reground when the penetration rate drops, or if any of the cemented-carbide buttons are damaged (fractured buttons should be ground flat). It is both practical and economical to redress the buttons when the wear flat reaches about 1/2 of the diameter of the button.

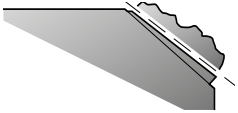
Look out for "snake skin"



If microscopic fatigue cracks – so-called "snake skin" – begin to appear on the cemented carbide buttons, the cracks must be ground away. In any event, bits should be reground after 300 metres of drilling at the most.

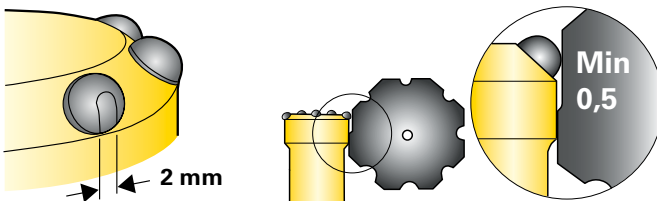
This should be done even if there are no visible signs of wear and the penetration rate continues to be good. If snake-skin is not removed, the cracks will deepen and ultimately result in button fracture.

Always grind broken buttons flat



A drill bit can remain in service as long as the gauge buttons maintain the diameter of the bit. Fractured buttons must always be ground flat to prevent chips of cemented carbide from damaging the other buttons.

Avoid grinding the perimeter



Gauge button anti-taper has to be removed by grinding, although excessive reduction of the bit diameter should be avoided. Leave about 2 mm of the wear flat.

If necessary, remove some of the bit-body steel below the gauge buttons, so that a clearance (taper) of 0,5 mm is maintained.

Make sure that the flushing holes are open.

Grinding wheel

Diamond grinding wheels are sensitive to impact, vibration and heat. The grinding wheel must therefore work without vibration and with generous cooling!

The grinding wheel must be mounted with the smaller diameter closest to the locking screw. Use original wheels only.

Steel removal

In the case of heavy bit wear, one should remove the steel around the button to obtain maximum service life of the diamond grinding wheel. This is done in the simplest way by means of using a straight silicon-carbide grinding wheel or by sandblasting.

Maintenance



- Before attempting service or repair work on the machine, ALWAYS switch off and disconnect the electricity and hydraulic supply.

Cleaning and washing

Keep the machine clean at all times. This is the cheapest and easiest way to maintain the machine. Even though the machine has high IP class, avoid spraying water directly to electric components. Also be careful what chemicals being used. If rig is washed by a high pressure system, we recommend to first protect the grinding machine by covering it.

Lubrication

Most bearings and bushings in the machine are permanently lubricated and do not normally need any maintenance.

Moving parts shall be cleaned and oiled to keep optimal functionality.

There are two grease nipples for lubrication at the arm unit. The nipples should be greased on a regular basis of 2-4 strokes per nipple and week. Recommended grease: Mobil SHC100 or SKF LGBB2.

Repairs and service

For repairs, see section Fault finding.

There is a working hour counter inside the electric box. Follow our recommended maintenance intervals from table.

Check point	8 h	40 h	200 h	500 h	2000 h
Electric functions	x				
Coolant level	x				
General leakage	x				
Grease nipples		x			
Oil moving parts			x		
Change oil filter				x	
Arm bushings					x
Clean bellows			x		
Inductive sensor gap					x

Disposal



A used machine must be treated and disposed in such a way that the greatest possible portion of the material can be recycled and any negative influence on the environment is kept as low as possible, and with respect to local restrictions.

Accessories and consumables

Grinding machine



Description	Product No.
Grind Matic RH3	87005200

Rig brackets



Description	Product No.
Kit for Epiroc cabin rigs	87005205
Kit for FlexiROC T35R rigs	87005206

Oil filter

Description	Product No.
Filter + bracket	87004952

Main bit holders



Description	Product No.
Multi grip	87004360
Tophammer*	87004964

*Must be completed with thread specific bit holder. If you have choosen a bracket for Tophammer in the table above, make sure you complete it with a bit holder in the table below.

Bit holders for button bits – Tophammer



Description	Product No.
Threaded bits	
Bit holder R25	87003475
Bit holder R28	87003476
Bit holder Magnum SR28	87003960
Bit holder R32	87003477
Bit holder Magnum SR32	87003962
Bit holder Magnum SR35	87004056
Bit holder TC35	87004685
Bit holder R38	87004686
Bit holder T38	87004687
Bit holder Magnum SR38	87003978
Bit holder Magnum SR38 retrac	87004081
Bit holder TC42	87004641
Bit holder T45	87003479
Bit holder TC45	87004569
Bit holder T51 and T51 retrac	87003521
Bit holder T60	87004562
Bit holder T-WIZ60	87005052

Consumables, spares and kits



Description	Product No.
Centering fingers, S (3 pcs) <11 mm	87004868
Centering fingers, M (3 pcs) 10-14 mm	87004871
Centering fingers, L (3 pcs) >13 mm	87004872
Splash guard	87004423
Belt	87004944
Gear kit (gears + belt)	87004791
Oil filter insert (10 micron)	87004953

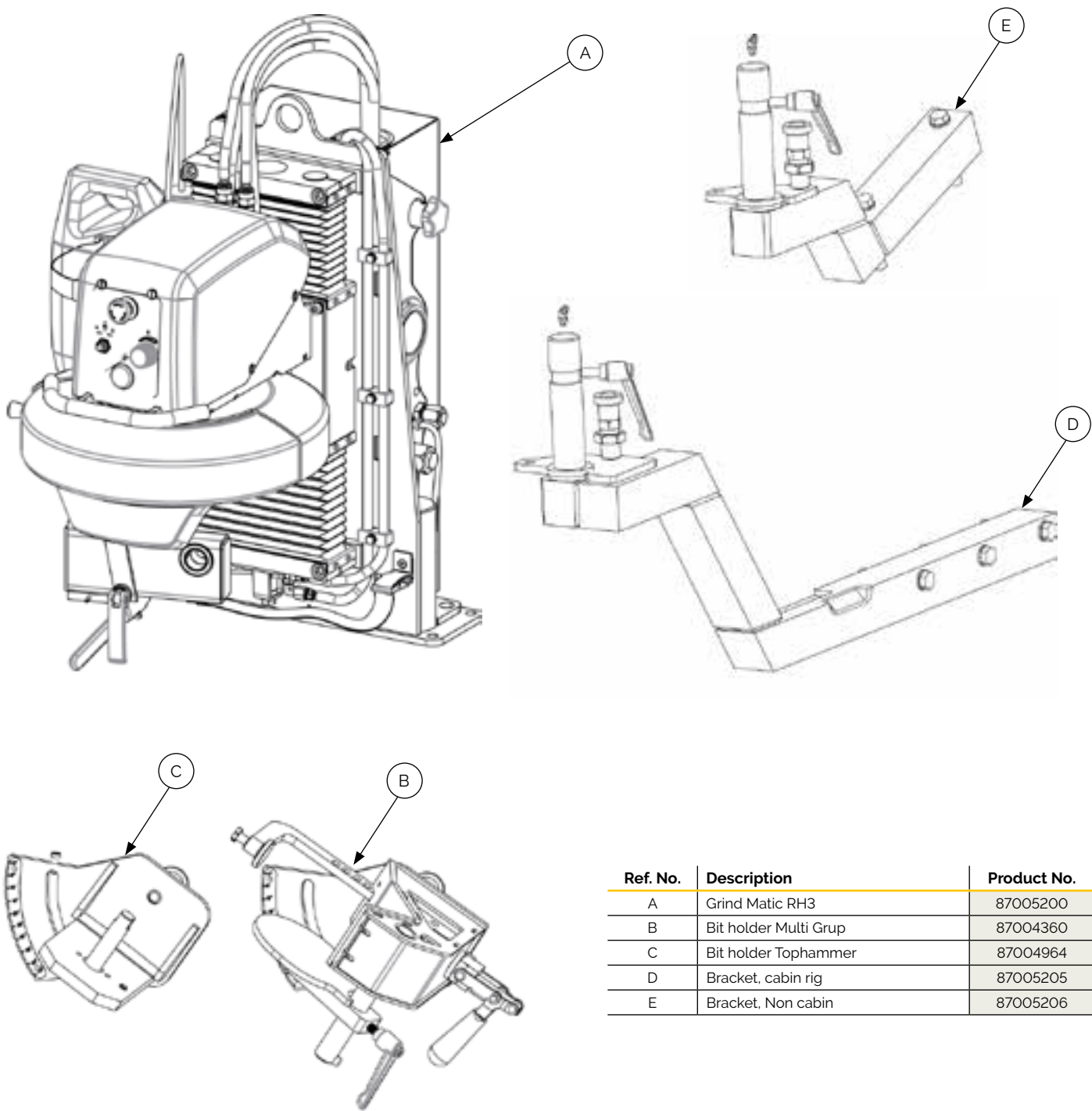
Recommended grease: Mobil SHC100 or SKF LGBB2.

Diamond grinding wheels for button bits



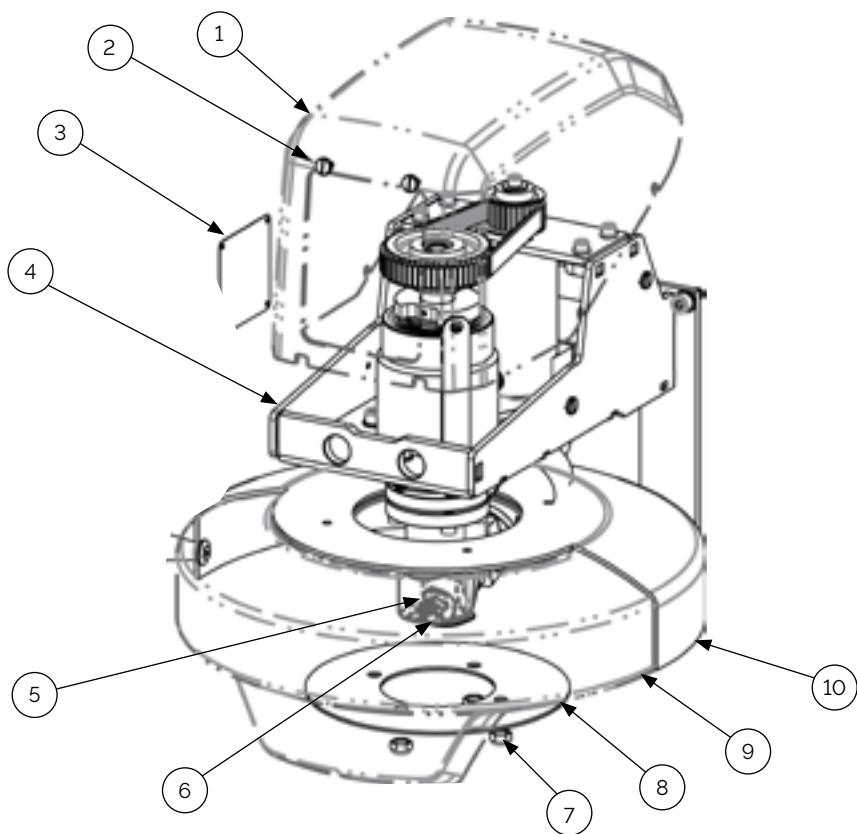
Dimension, mm	Product No.
Spherical	
8	87005032
9	87005033
10	87005049
11	87004851
12	87005050
12,7	87004852
14,5	87004853
15,8	87004854
19,1	na
Ballistic	
8	87005034
9	87005035
10	87005036
11	87004855
12	87005051
12,7	87004856
14,5	87004857
15,8	87004858
19,1	na
Trubbnos	
9	87004809
10	87004810
11	87004811
12	87004812
12,7	87004813
14,5	87004814
15,8	87004815
19,1	87004816

Spare parts list



Ref. No.	Description	Product No.
A	Grind Matic RH3	87005200
B	Bit holder Multi Grup	87004360
C	Bit holder Tophammer	87004964
D	Bracket, cabin rig	87005205
E	Bracket, Non cabin	87005206

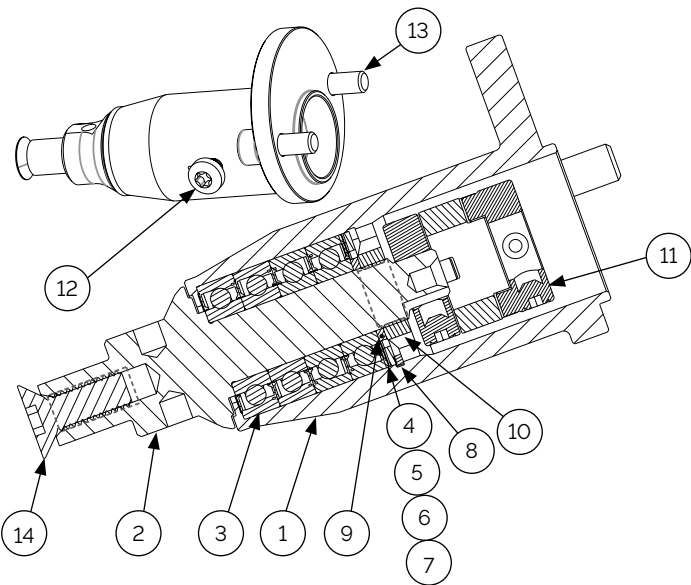
Frame unit



Ref. No.	Description	Product No.
1	Cover, top	87005218
2	Screw	87005084
3	Machine ID	87004966
4	Frame	87005215
5	Grinding wheel	-

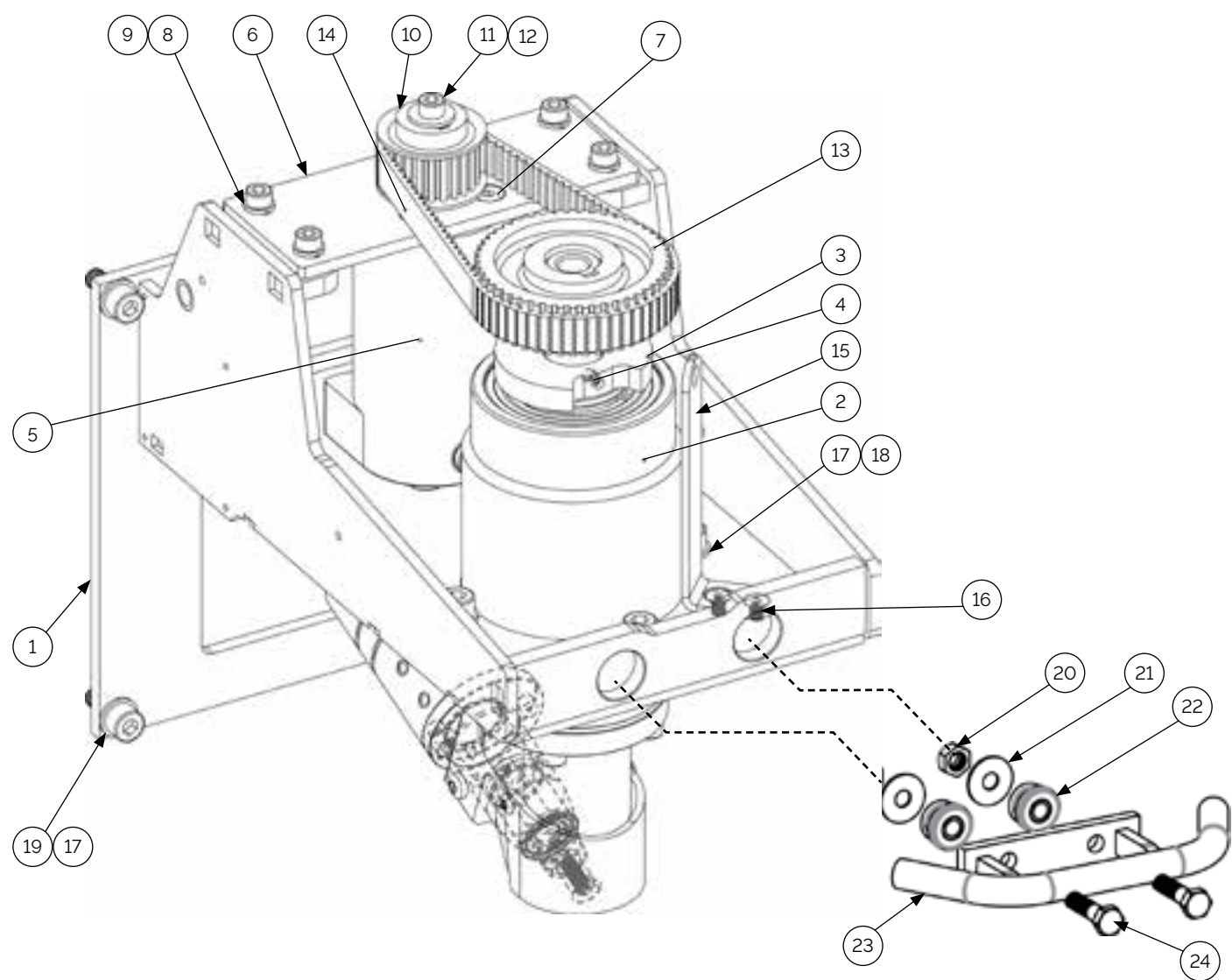
Ref. No.	Description	Product No.
6	Centering finger	-
7	Nut	87004191
8	Assembly	87004958
9	Cover, front	87004916
10	Cover, back	87004915

Spindle



Ref. No.	Description	Product No.
1	Housing	-
2	Axle	-
3	Bearing	87005243
4	Shim	0324 1551 20
5	Shim	0324 1551 19
6	Shim	87005027
7	Shim	0324 1551 92
8	Circlip	0335 3516 01
9	Shim	-
10	Nut	0295 3101 00
11	Coupling	87005242
12	Screw	87005244
13	Screw	87004977
14	Screw	87000453
-	Grinding spindle, complete	87005241

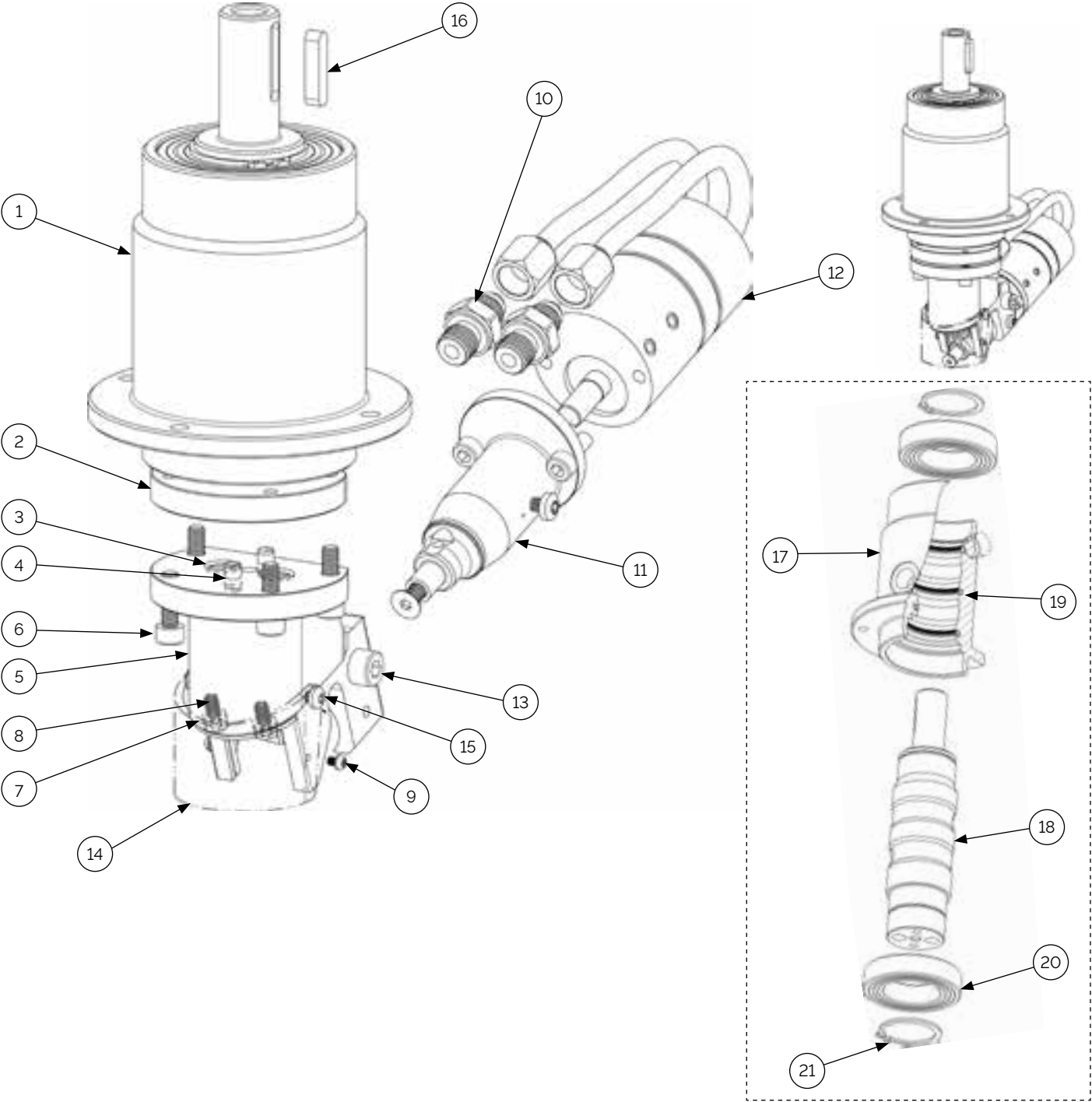
Rotation head



Ref. No.	Description	Product No.
1	Frame	87005215
2	Master unit	87004946
3	Disc	87004941
4	Screw	87003469
5	Motor, orbital	87005249
6	Bracket	87005216
7	Screw	87000843
8	Washer	87000788
9	Screw	87000201
10	Pulley, 24t	87004943
11	Washer	87004006
12	Screw	87000197

Ref. No.	Description	Product No.
13	Pulley 48t	87004942
14	Belt	87004944
15	Bracket	87004968
16	Screw	87004967
17	Washer	87000131
18	Screw	87001747
19	Screw	87129958
20	Nut	87004298
21	Washer	87005043
22	Bushing	87005031
23	Handle	87004912
24	Screw	0211 1365 03

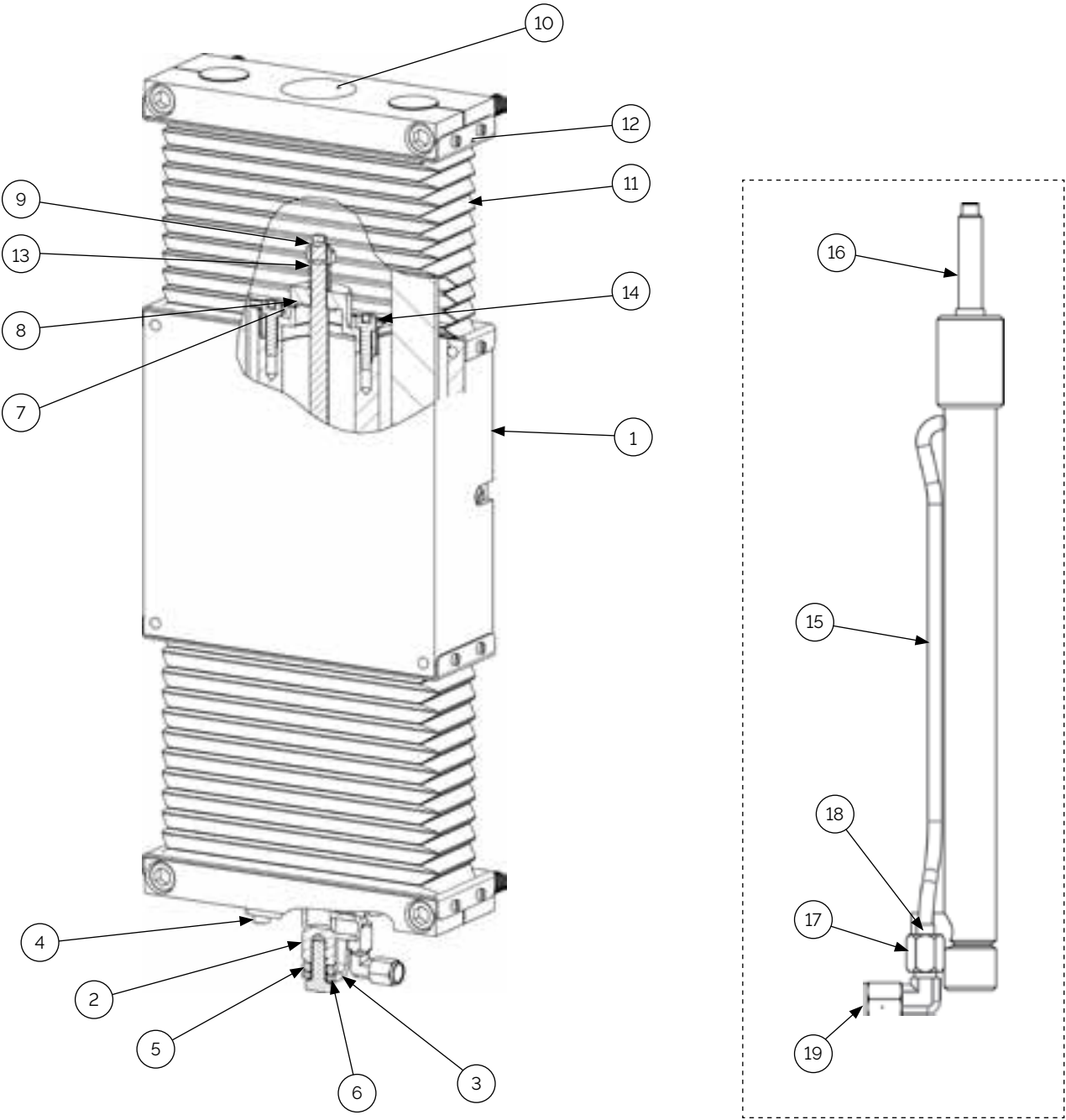
Rotation unit



Ref. No.	Description	Product No.
1	Master unit	87004946
2	Plate	87004947
3	O-ring	87004948
4	Pin	87004949
5	Bracket	87005239
6	Screw	87001440
7	Plate	87004874
8	Screw	87003669
9	Screw	0217 1101 26
10	Adapter	3317 0004 81
11	Spindle	87005241

Ref. No.	Description	Product No.
12	Motor	87004974
13	Screw	87004957
14	Guard	87004423
15	Screw	0226 0350 51
16	Key	87004961
17	Housing	-
18	Axle	-
19	O-ring kit	87004969
20	Bearing	87004970
21	Circlip	87004971

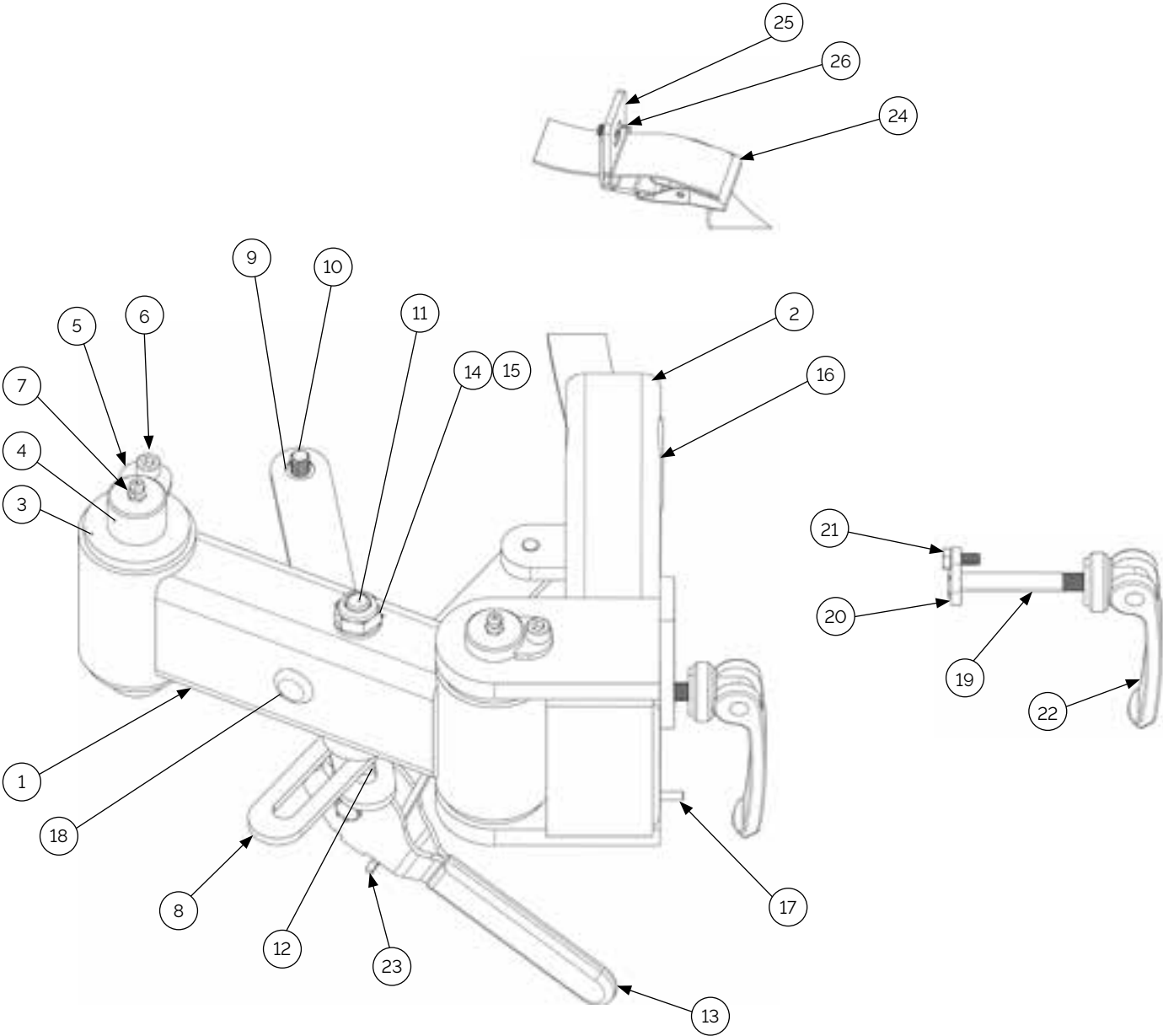
Feed unit



Ref. No.	Description	Product No.
1	Guide	87004930
2	Cylinder	87004931
3	Bracket, lower	87004932
4	Screw	87000201
5	O-ring	87004933
6	Screw	87000166
7	Bracket, upper	87004934
8	Washer	87004935
9	Nut	87004928
10	Plug	87004937

Ref. No.	Description	Product No.
11	Gaiter	87004965
12	Assembly	-
13	Spring	87005061
14	Screw	87001747
15	Pipe	-
16	Bar	-
17	Nut	3176 6613 00
18	Sleeve	3177 3047 00
19	Coupling	3176 7872 00
-	Feed cylinder, ref. 15-19	-

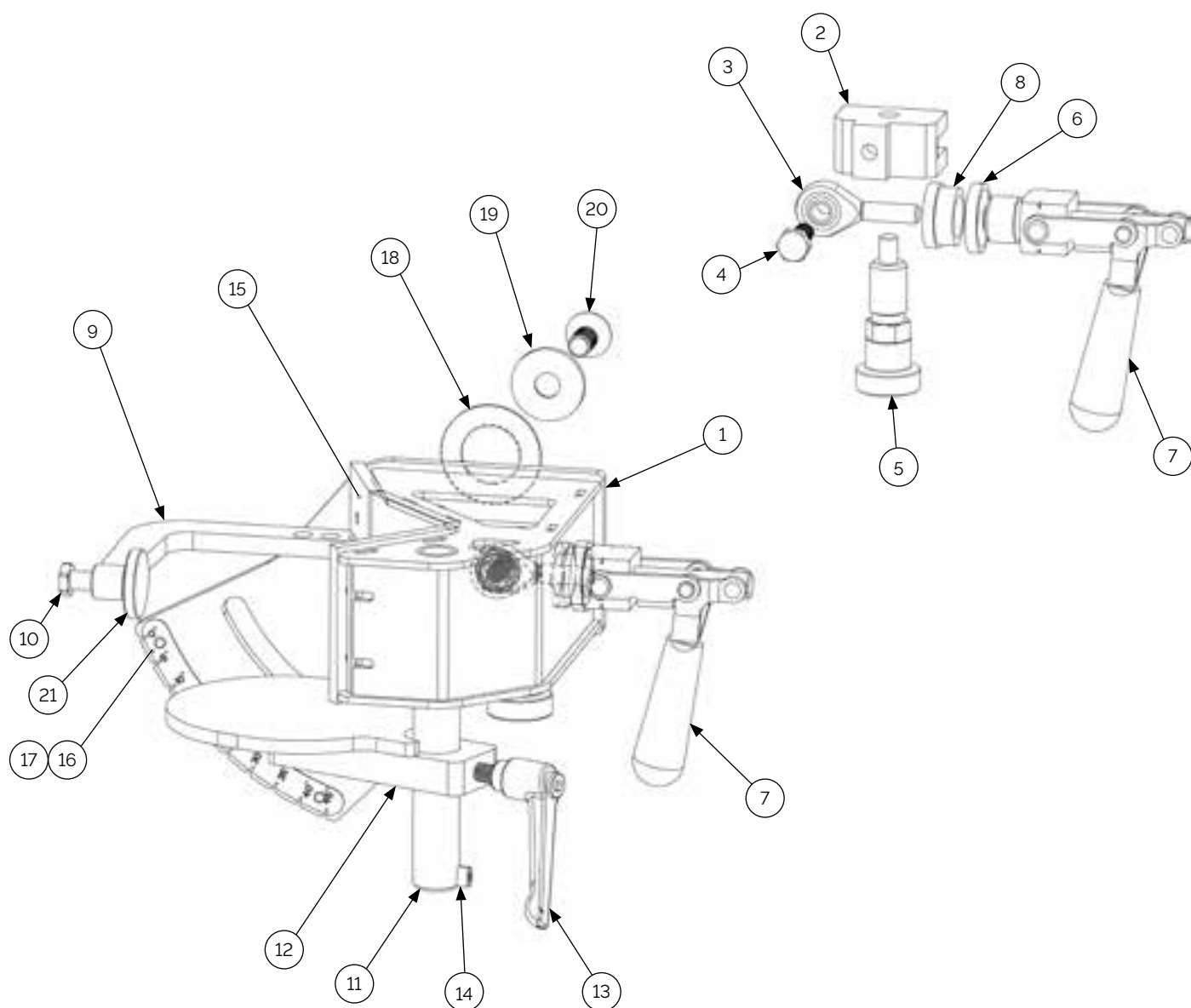
Arm unit



Ref. No.	Description	Product No.
1	Arm	87004919
2	Arm	87004920
3	Bushing	87001426
4	Shaft	87004921
5	Bracket	87004922
6	Screw	87000197
7	Nipple	87004014
8	Rail	87004923
9	Bushing	87004924
10	Screw	87000926
11	Bolt	87004925
12	Washer	87004926
13	Handle	87004927

Ref. No.	Description	Product No.
14	Washer	87000167
15	Nut	87004928
16	Bushing	87004200
17	Pin	87004915
18	Plug	87004398
19	Screw	87000810
20	Washer	87004368
21	Screw	87001909
22	Handle	87004354
23	Bracket	87005217
24	Strap	3176 3681 00
25	Bracket	87003071
26	Screw	87004967

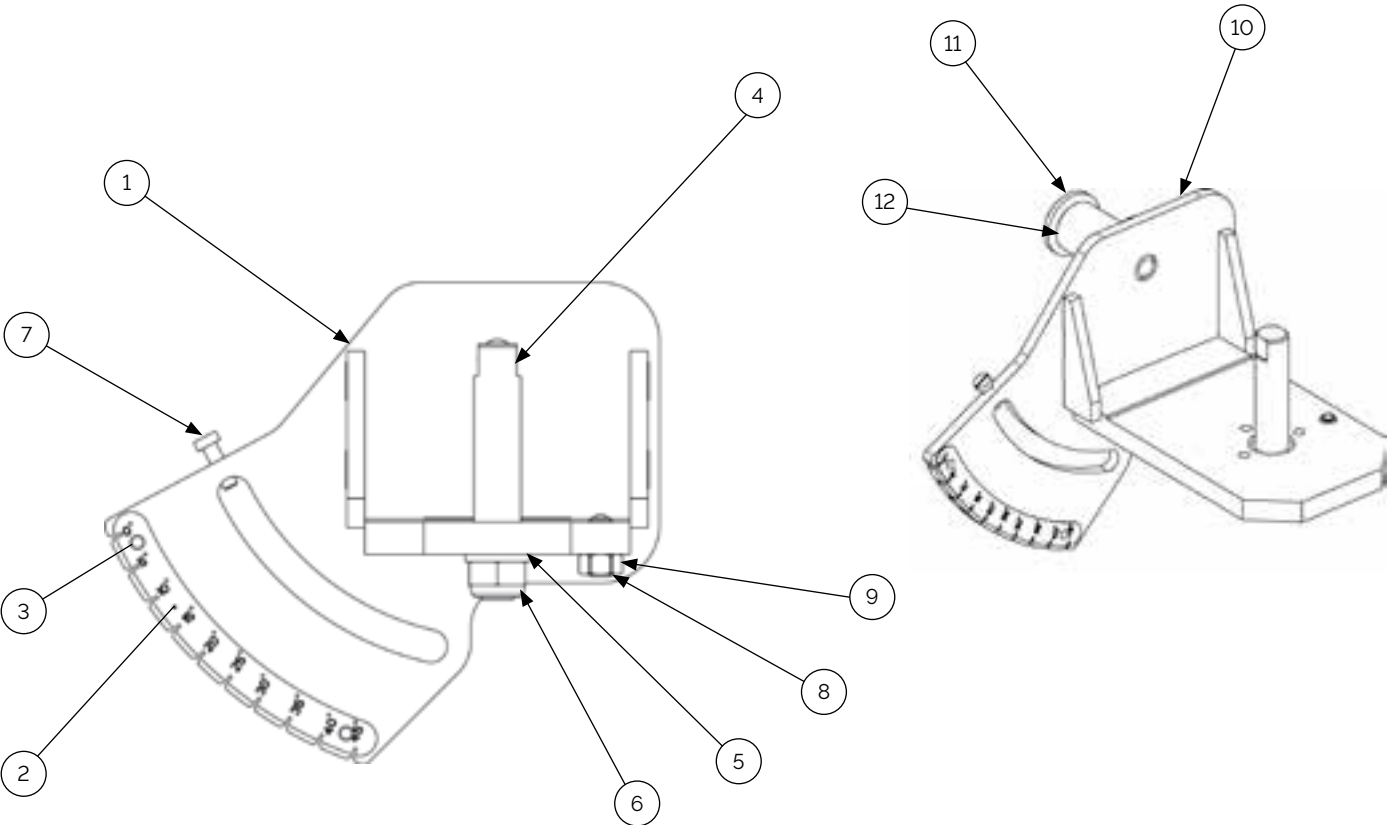
Bit holder – Multi Grip



Ref. No.	Description	Product No.
1	Frame	87004361
2	Clamp	87004362
3	Rod	87004357
4	Screw	87001071
5	Plunge	87004355
6	Shims	87004364
7	Clamp	87004356
8	Nut	87004365
9	Bar	87004863
10	Nut	87003879
11	Pin	87004366

Ref. No.	Description	Product No.
12	Bracket	87004867
13	Lever	87003893
14	Screw	87003669
15	Rubber	87004370
16	Scale	87004284
17	Rivet	87004294
18	Washer	87004199
19	Washer	87004188
20	Screw	87004209
21	Screw	87004358
-	Bit holder unit complete	87004360

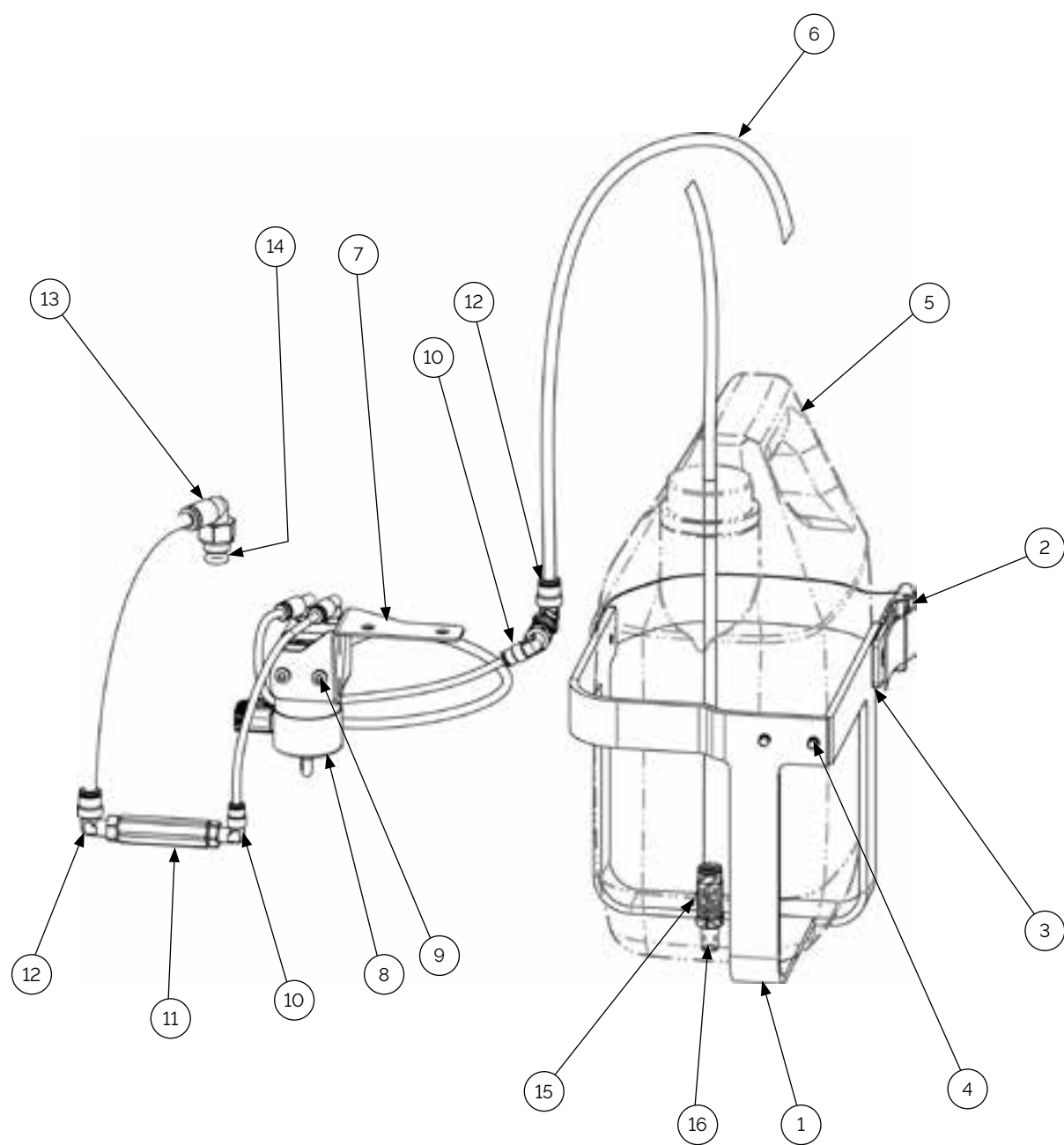
Bit holder – Tophammer



Ref. No.	Description	Product No.
1	Frame	-
2	Scale	87004284
3	Rivet	87004294
4	Pin	87004862
5	Washer	87000430
6	Nut	87000445
7	Screw	87000165

Ref. No.	Description	Product No.
8	Screw	87003196
9	Nut	87000496
10	Washer	87004199
11	Washer	87004188
12	Screw	87004209
	Bit holder unit complete	87004964

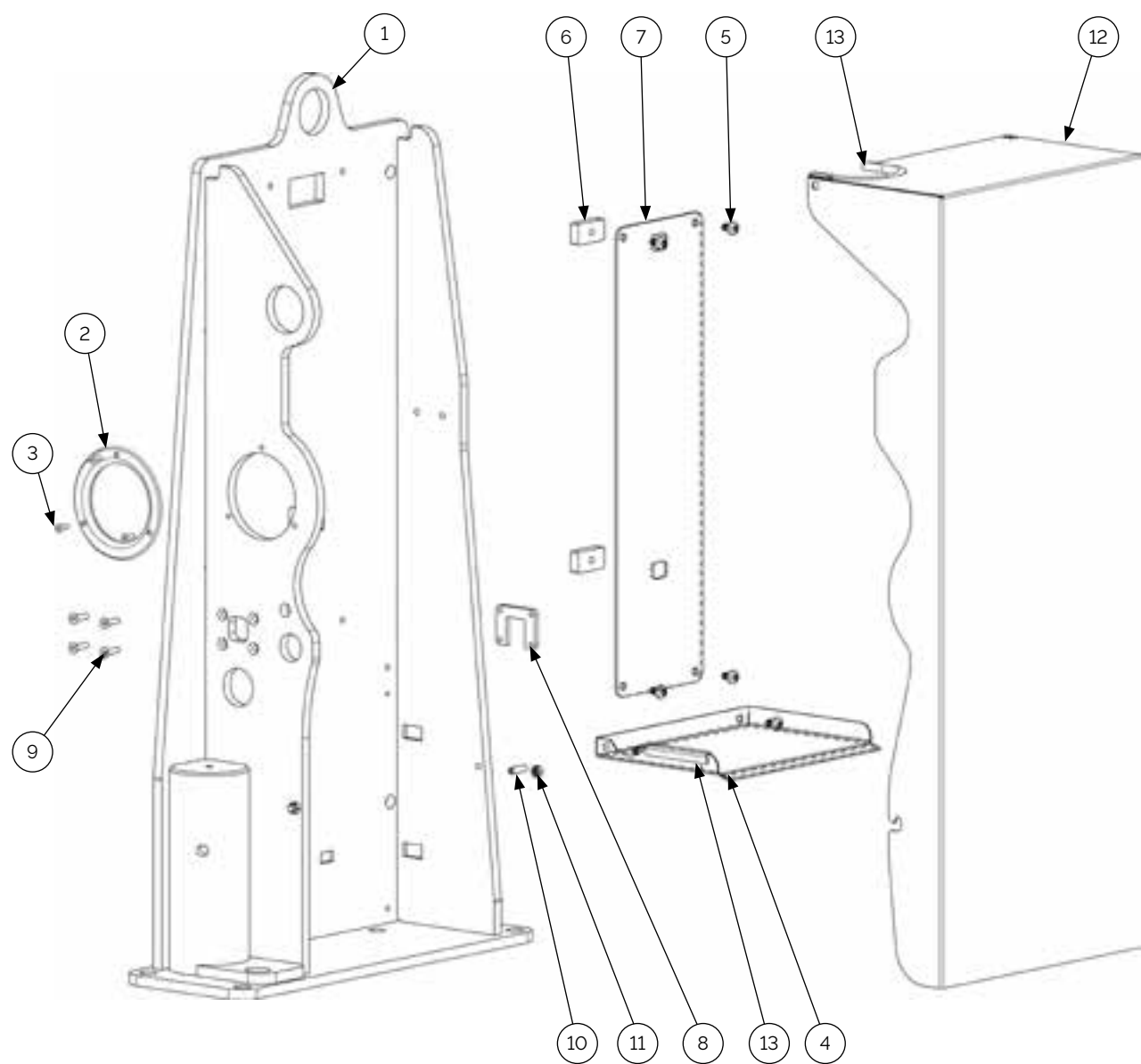
Coolant system – complete



Ref. No.	Description	Product No.
1	Bracket (for tank)	87005055
2	Strap	3716 3681 00
3	Bracket	87003071
4	Screw	87004967
5	Tank	87005053
6	Hose	87004062
7	Bracket	87004078
8	Pump	87004077

Ref. No.	Description	Product No.
9	Screw	87005026
10	Coupling	87004338
11	Valve	87004079
12	Coupling	87003816
13	Swivel	87004945
14	O-ring	87004960
15	Coupling	0583 8100 88
16	Filter	87001063

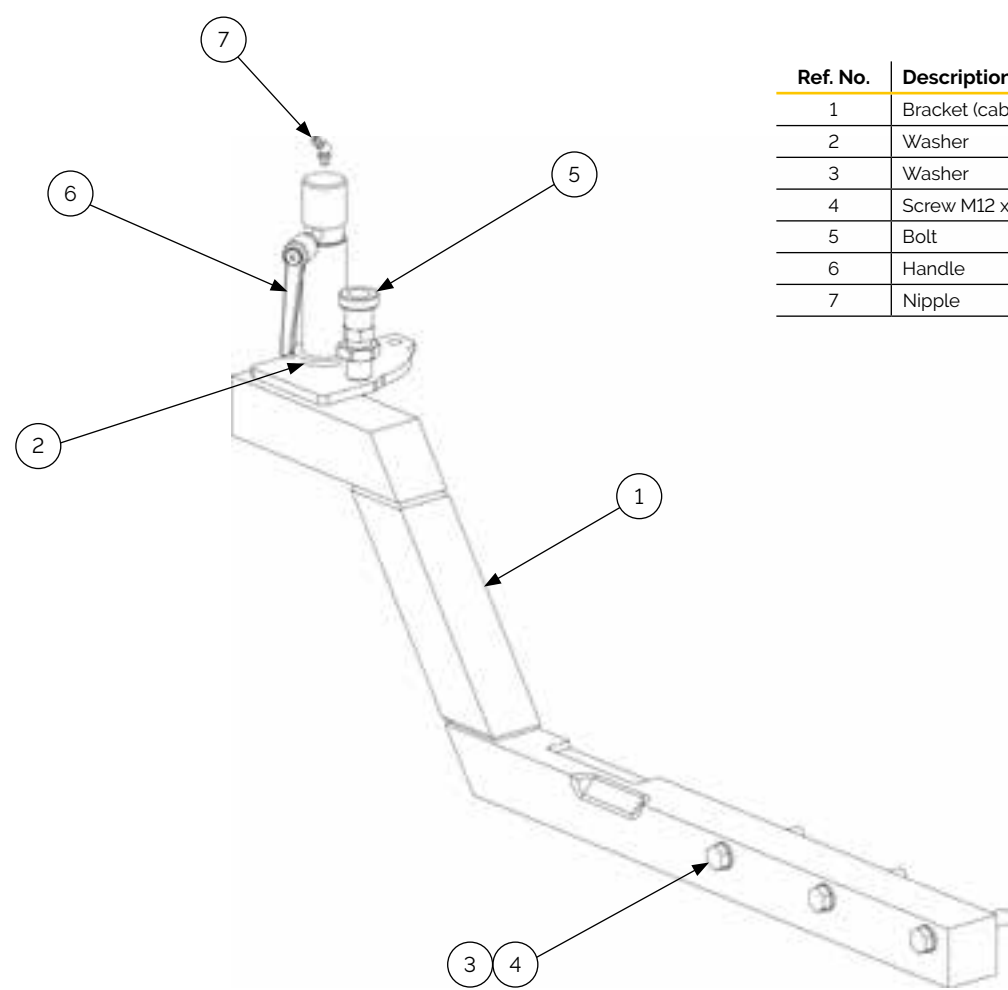
Main frame



Ref. No.	Description	Product No.
1	Frame	87005210
2	Assembly	87004584
3	Rivet	0129 3102 00
4	Bracket	87005214
5	Screw	87005244
6	Nut	87005212
7	Bracket	87005211

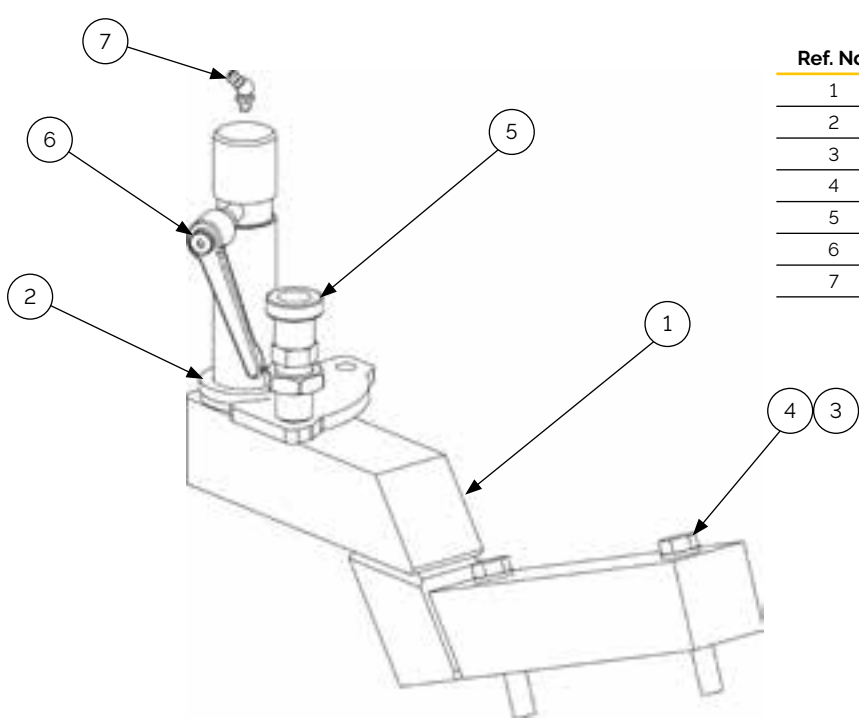
Ref. No.	Description	Product No.
8	Assembly	87005208
9	Screw	0126 1100 83
10	Screw	0190 1241 17
11	Nut	0291 1107 00
12	Cover	87005213
13	Strip	87004439

Bracket for cabin rigs



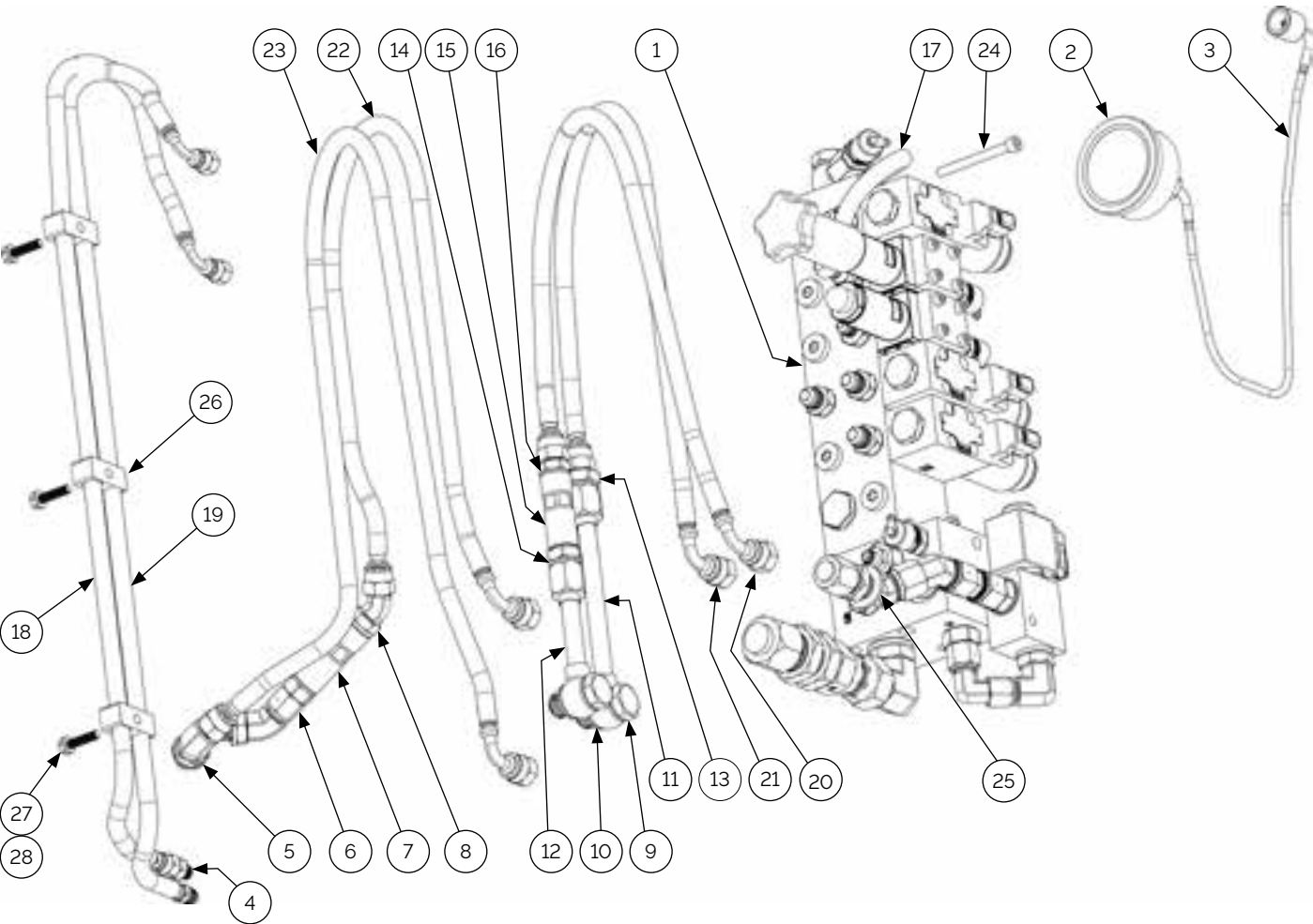
Ref. No.	Description	Product No.
1	Bracket (cabin rigs)	87005040
2	Washer	87002949
3	Washer	87000430
4	Screw M12 x 80, 10.9"	5730 0825 97
5	Bolt	87005060
6	Handle	87000242
7	Nipple	87004936

Bracket for non cabin rigs



Ref. No.	Description	Product No.
1	Bracket (non cabin rig)	87005047
2	Washer	87002949
3	Washer	87000430
4	Screw M12 x 80, 10.9"	5730 0825 97
5	Bolt	87005060
6	Handle	87000242
7	Nipple	87004936

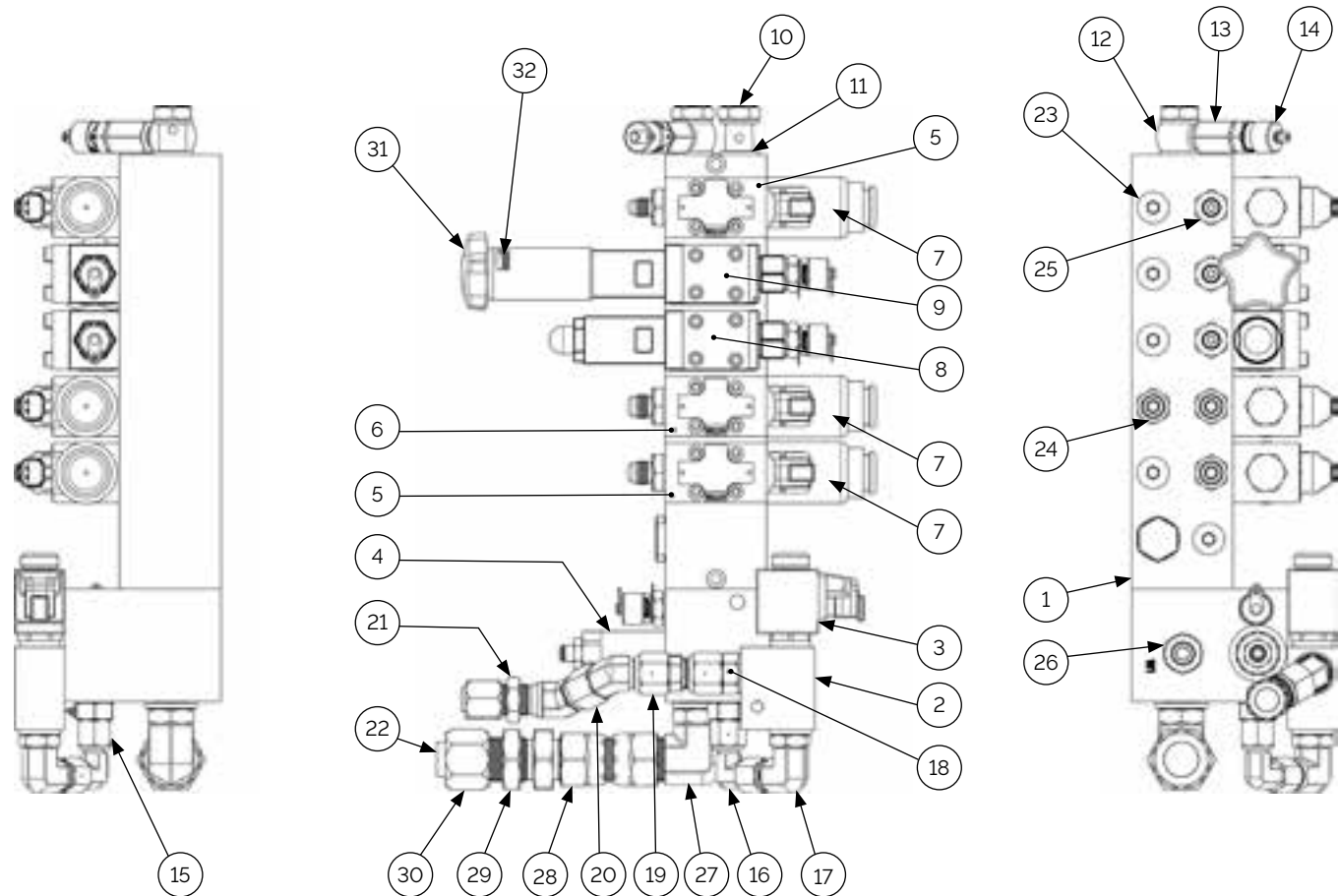
Hydraulic components



Ref. No.	Description	Product No.
1	Valve unit	87005250
2	Gauge	87005267
3	Hose	87005257
4	Adapter (flow limit)	87005268
5	Adapter	0570 5091 04
6	Nut	0570 5040 28
7	Valve (flow control)	87005045
8	Adapter	3176665200
9	Screw	0627 5100 14
10	Washer	0661 1026 00
11	Pipe B2 (flared)	87005072
12	Pipe A2 (flared)	87005073
13	Adapter	5500 4704 00
14	Adapter	0570 5010 95

Ref. No.	Description	Product No.
15	Valve (flow control)	87005258
16	Adapter	3176 6348 00
17	Hose A4	87004981
18	Hose A3	87005251
19	Hose A5	87005252
20	Hose A2	87005253
21	Hose B2	87005254
22	Hose A1	87005255
23	Hose W1	87005256
24	Screw	0211 1256 03
25	Washer	87004440
26	Clamp	87005262
27	Washer	87000788
28	Screw	87001338

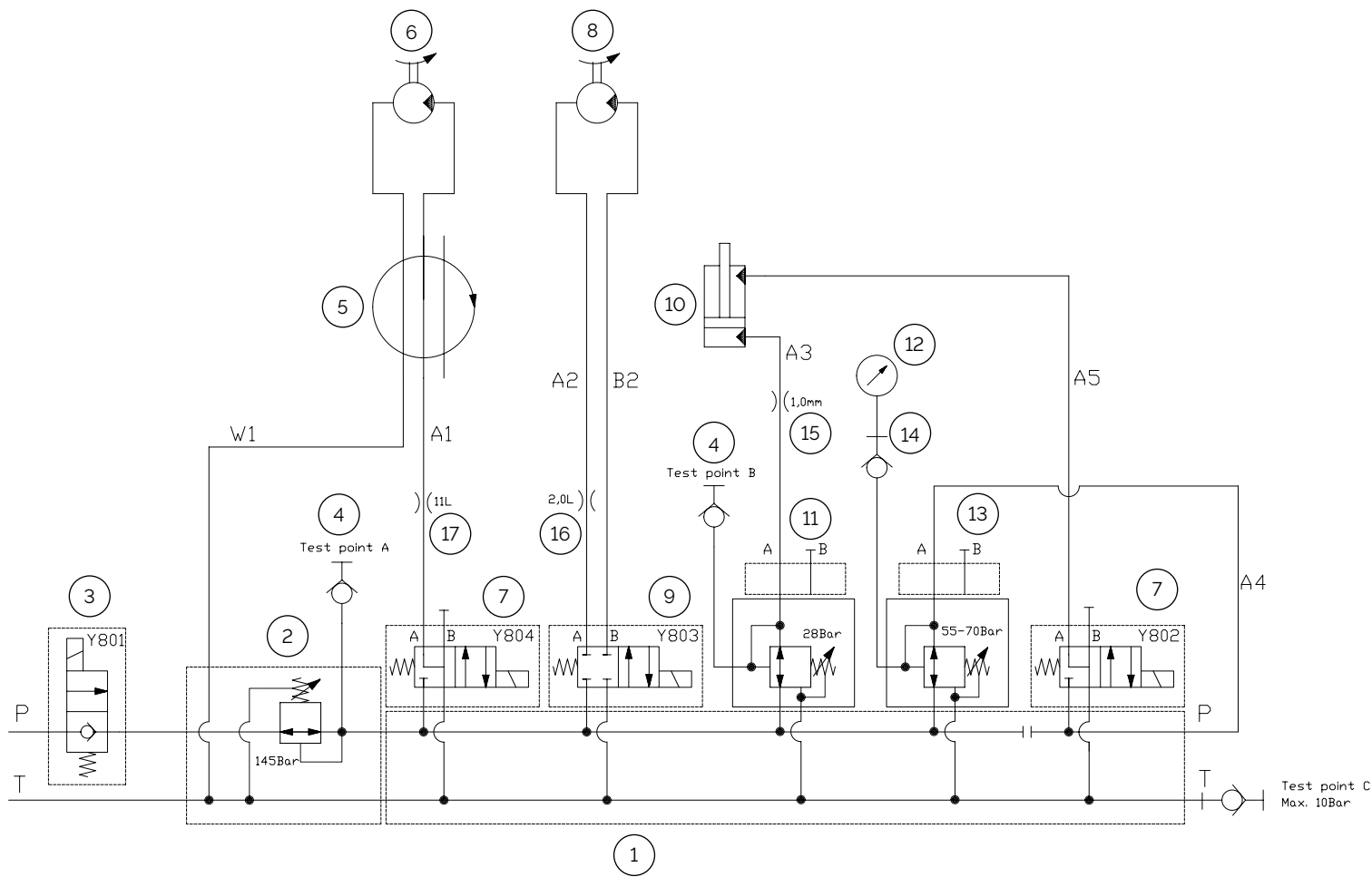
Hydraulic components



Ref. No.	Description	Product No.
1	Valve block	87005071
2	Valve (emergency stop)	87004978
3	Coil (emergency stop)	87005266
4	Valve (pressure reducing)	87005062
5	Valve (directional)	87005063
6	Valve (directional)	87005064
7	Coil	87005265
8	Valve (pressure reducing)	87005065
9	Valve (pressure reducing)	87005066
10	Bolt	0627 5100 14
11	Washer	0661 1026 00
12	Banjo	87005263
13	Adapter	87005264
14	Nipple (test) S12.65 x 1.5 - G¾"	3177 3016 00
15	Nut	0570 5040 32
16	Adapter	3715 0584 00

Ref. No.	Description	Product No.
17	Adapter	3176 6352 00
18	Adapter	3176 8270 00
19	Adapter	87005260
20	Adapter	3176 6548 00
21	Bulkhead	5500 4824 00
22	Nut	3176 5313 00
23	Plug	0686 3718 15
24	Adapter	3176 6348 00
25	Adapter	0570 5010 89
26	Adapter	3176 6349 00
27	Adapter	3176 6556 00
28	Adapter	87005261
29	Bulkhead	3176 6499 00
30	Nut	3715 0820 00
31	Star knob	87005259
32	Screw, cylinder	0196 1320 00

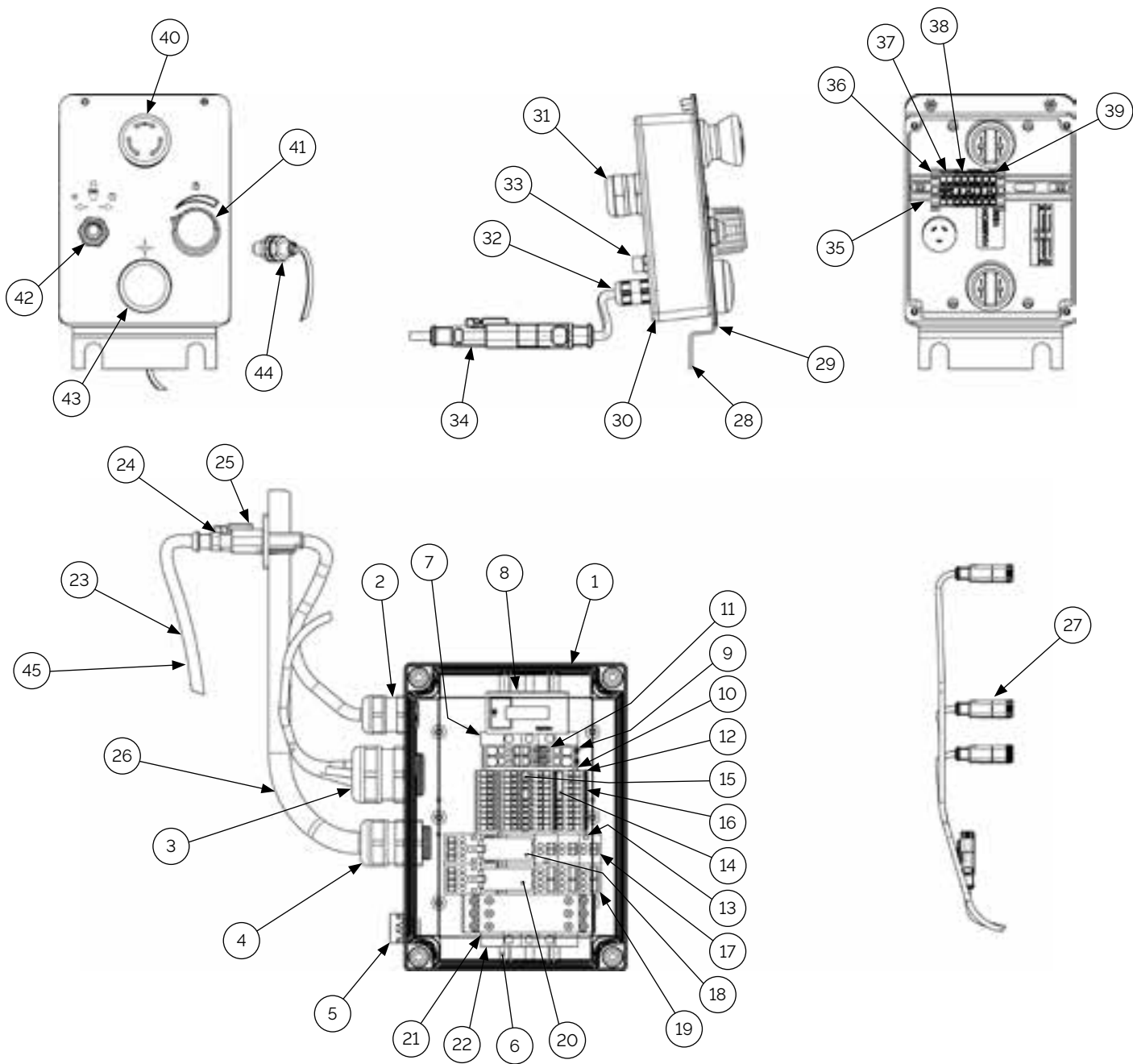
Hydraulic diagram



Ref. No.	Description	Product No.
1	Valve block	87005071
2	Valve (pressure reducing)	87005062
3	Valve (emergency stop)	87004978
4	Nipple (test)	3177 3016 00
5	Rotation unit	87004946
6	Motor, spindle	87004974
7	Valve (directional)	87005063
8	Motor (orbital) 20CC	87005249
9	Valve (directional)	87005064

Ref. No.	Description	Product No.
10	Cylinder (feed)	87004931
11	Valve (pressure reducing)	87005065
12	Gauge Ø63	87005267
13	Valve (pressure reducing)	87005066
14	Hose	87005257
15	Adapter (flow limit)	87005268
16	Valve (flow control)	87005258
17	Valve (flow control)	87005045

Electric components

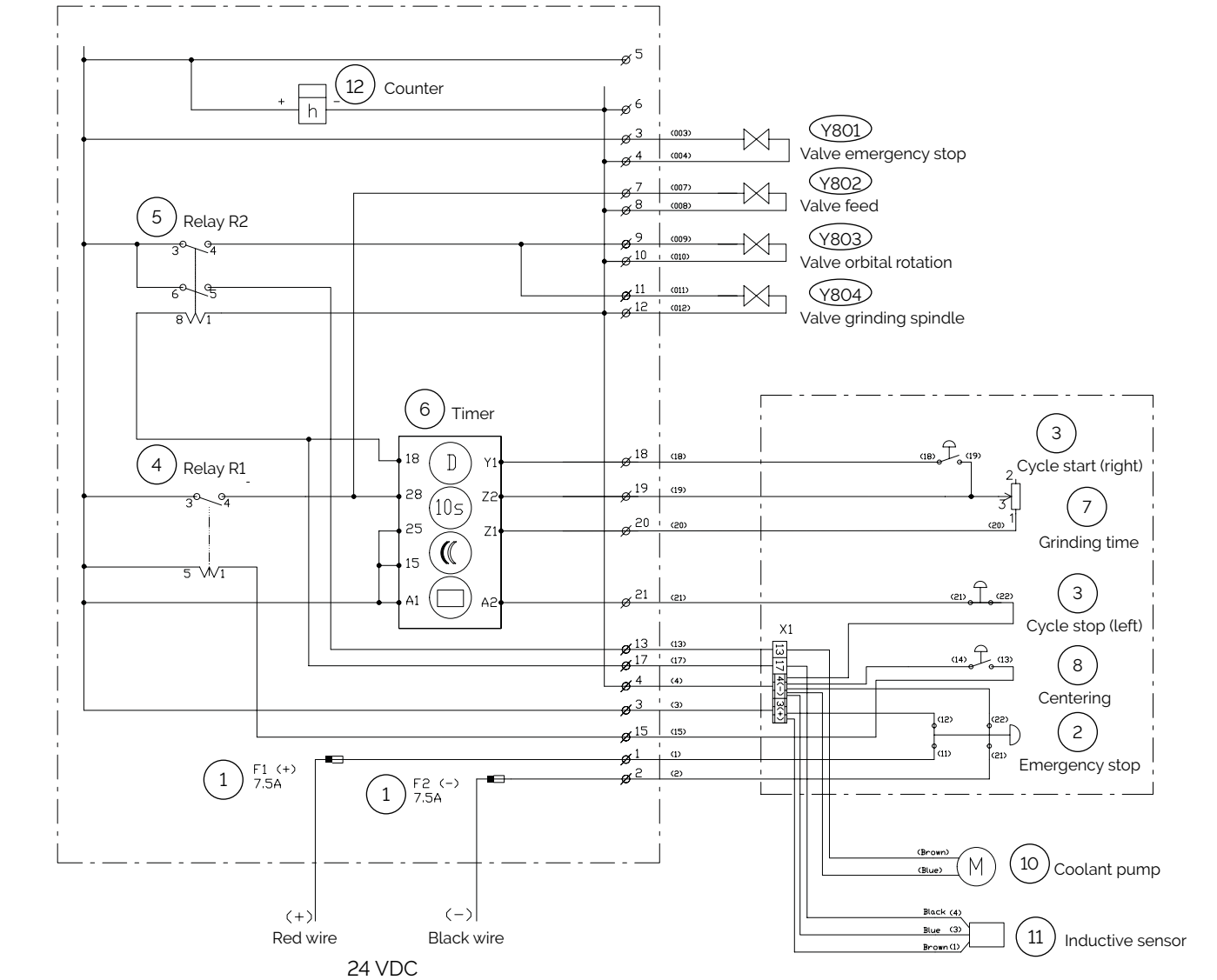


Ref. No.	Description	Product No.
1	Box	87004049
2	Grommet (M16)	87004976
3	Grommet (M25)	87004975
4	Grommet (M20)	87004891
5	Valve	87004050
6	DIN rail	87004670
7	Bracket	87004511
8	Counter	87004510
9	Fuse holder (mini)	87004879
10	Bracket	87004880
11	Fuse 7,5A	87004883
12	Terminal block, PTTB1.5	87004876
13	Plinth	87004877
14	Bridge	87004878
15	Bridge	87004890

Ref. No.	Description	Product No.
16	Marker	-
17	Socket	87004069
18	Relay	87004992
19	Socket	87004070
20	Relay	87004993
21	Timer	87004071
22	Support	87003623
23	Wire	87004998
24	Connector (male)	87004886
25	Connector (female)	87004885
26	Control cable	87004887
27	Wire	87004892
28	Panel	87005220
29	Sticker	87004914
30	Box	87004493
31	Grommet (M20)	87004520

Ref. No.	Description	Product No.
32	Grommet (M12)	87004893
33	Adapter	87004894
34	Connector	87004896
35	DIN rail	87004698
36	Plinth	87004882
37	Plinth	87004881
38	Plinth	87004888
39	Plinth	87004889
40	Button (emerg. stop)	87004074
41	Potentiometer	87004075
42	Button (start/stop)	87004884
43	Button (centering)	87004072
44	Inductive sensor	87004895
45	Fuse holder	87005028

Electric diagram



Terminal No.	Cable-Core No.	Marker
1	CC1-1	1
2	CC1-2	2
3	CC1-3	3
	Y801-1 (Bn)	003
4	CC1-4	4
	Y801-2 (Bu)	004
7	Y802-1 (Bn)	007
8	Y802-2 (Bu)	008
9	Y803-1 (Bn)	009
10	Y803-2 (Bu)	010
11	Y804-1 (Bn)	011
12	Y804-2 (Bu)	012

Terminal No.	Cable-Core No.	Marker
13	CC1-6	13
15	CC1-5	15
17	CC1-7	17
18	CC1-8	18
19	CC1-9	19
20	CC1-10	20
21	CC1-11	21
Extra	C1 Yellow/Green	YL/Gn

Ref. No.	Description	Product No.
1	Fuse 7.5A mini	87004883
2	Button (emergency stop)	87004074
3	Button (start/stop)	87004884
4	Relay 1P	87004992
5	Relay 2P	87004993
6	Timer	87004071
7	Potentiometer	87004075
8	Valve unit	87005250
9	Button (centering)	87004072
10	Coolant pump	87004077
11	Inductive sensor	87004895
12	Counter	87004510

Fault finding

Part of machine	Problem area	Description	Code
Control panel	Start/stop	No signal	A
		Unknown function	B
			C
			D
			E
	Feed unit	No signal	A
		Unknown function	B
			D
			E
	Timer	No signal	A
		Unknown function	C
			E
	Emergency stop	No signal	A
		Unknown function	E
Cooling	Pump	No flow	F
		No signal	G
		Unknown function	E + R
Hydraulics	Spindle rotation	Weak	H
			I
			T
		Stop	A
			B
			D
	Orbital rotation	Weak	H
			S
			T
		Stop	A
			B
			D
	Feed	Weak	H
			J
			K
			T
Centering	Result	Difficult to center	I
			J
		Poor results	L
			M
Sharpening	Result	Button profile low	O
		Button angle	P
		Button broken	Q
		High temperature	G + R
	Grinding wheel	Short life	I
			L
			O
			P
			R

Code	Action
A	Check the incoming electrical and the fuses.
B	Check relay 1 and 2.
C	Check the timer settings (read the manual).
D	Test function manually. Use the test button at the coil.
E	Check all cables and connectors.
F	Check the coolant level and the hoses.
G	Check for hose leakage. Clean tank filter.
H	Check the main hydraulic pressure.
I	Decrease the pressure.
J	Increase the pressure.
K	Check return pressure in test point.
L	Adjust the centering fingers.
M	Use the locking handle.
O	Use an additional grinder for steel removal.
P	Adjust the angle at the holder.
Q	Remove broken buttons.
R	Check connections. Check valve, rotary joint.
S	Adjust the inductive sensor position.
T	Check the oil viscosity. See recommended oil types in the section "General care instructions / Hydraulics".

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