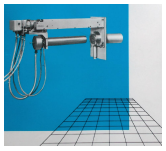
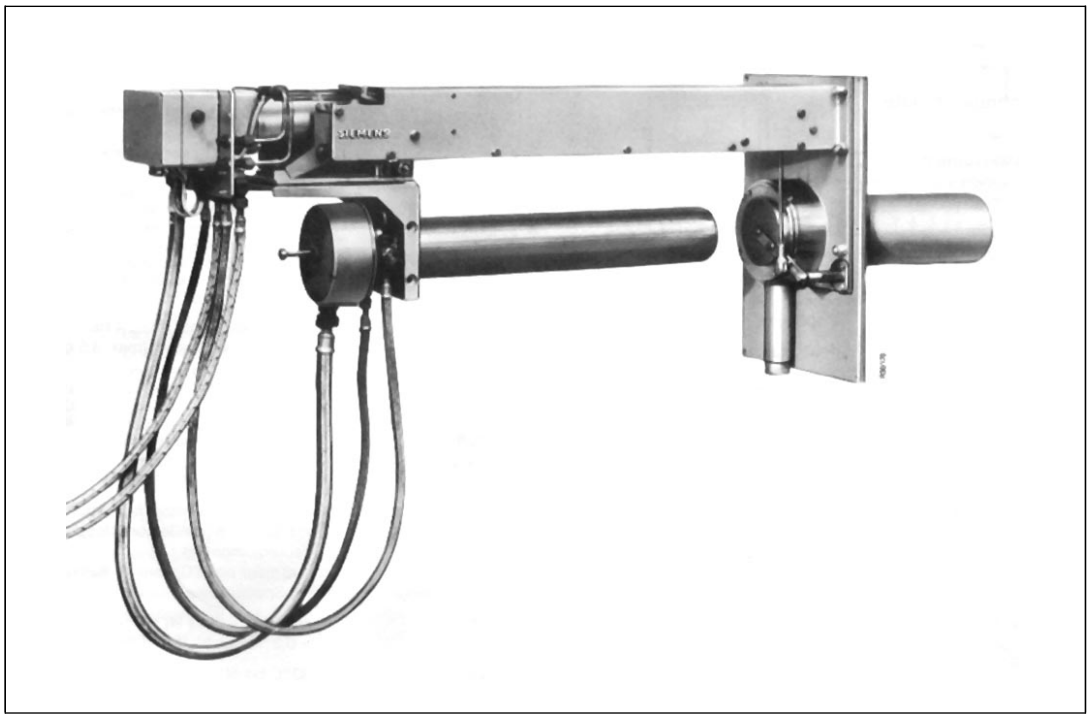


Retraction Device



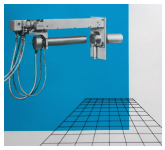
Retraction device

- Electro-pneumatically controlled retraction device for fully automatic retraction of a furnace probe camera out of the furnace in the case of failure of the cooling water supply, compressed air or mains supply. Damage to the camera or lens is thus prevented.
- Remote-controlled retraction is possible from the control room. Manual insertion and retraction is possible with a separate control unit 2GF1801-8AB.
- The device is driven with compressed air via solenoid valves in a separate compressed air unit.
- Designed for furnace pressures up to 3 mbar overpressure (with or without air nozzle for damming up the flue gases and prolonging the hold-up time of the probe camera housing in the furnace with or with out shutter), or for furnace overpressure up to 100 mbar with lock chamber, shutter for furnace and air nozzle.
- Stroke length 750 or 1050 mm; automatic shutter locking when camera is retracted.
- Mounting position: viewing angle up to 90° downwards (above 3° with automatic insertion stop) or up to 45° upwards.
- Base plate for mounting on furnace wall, with or without water cooling; retraction device is mounted onto base plate using screws.
- Exact centering and securing of probe camera without additional adjustment.
- Minimum space and servicing requirements due to a special stroke cylinder with permanent lubrication for ambient temperatures up to 80 °C or up to 120 °C (e.g. for use on glass smelting furnaces).
- Swing-out probe camera, degree of protection IP 03, dust- insensitive.
- Connections for working air (insertion and retraction), cooling air, cooling water and electric connections to the probe camera.
- The conditions for installation in glass troughs have been considered.
- Junction box with pressure monitor for purging air pressure, air-cooled set of tubes and cables

Other features

- Each one of the 6 conditions mentioned below will effect automatic retraction of the probe camera:

1. Exceeding of the cooling water temperature (e.g. 40 °C) set on the thermostat in the probe camera housing.
2. Drop of the air pressure below the value (e.g. 4 bar) set on the compressed air unit.
3. Drop of the purging air pressure below the value (e.g. 0.2 bar) set on the compressed air unit.
4. Power supply failure.
5. Interruption of a control line for air, water or temperature monitoring.
6. Retraction command from the control room or the control unit.

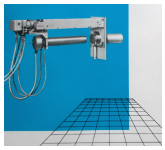


Retraction Device

- The insertion or retraction process is initiated either automatically or manually via a control unit with a compressed air unit. The retraction process can be initiated directly from the control room with an additional key.
- With a 750 mm stroke the overall length from the base plate is only 1.3 m including the junction box.
- Oil in the compressed air is unnecessary due to special permanent lubrication.
- The insertion depth (length of the probe camera housing from the base plate) of the short probe is 528 mm with straight viewing and 550 mm with elbowed viewing. The insertion depth is extended by 86 mm without an air nozzle.
- Swivelling mechanism of the retracted probe camera housing: After unscrewing 2 hexagon nuts, the probe camera housing can be swivelled to the right or to the left by max. 90° for servicing or for the installation or removal of the camera. No additional space beyond the original length is required for the installation.
- The permissible ambient temperature for the stroke cylinder is either up to 80 °C or up to 120 °C with special gaskets. For ambient temperatures over 70 °C an additional air-cooled protection tube (up to 10 m long) with a casing is available in addition to a junction box with a set of tubes and cables.
- A switching-off facility for the purging air supply (with retracted camera) via a limit switch, combined with an additional purging air valve in the compressed air unit 2GF1703-... is also available.
- The version without a lock chamber contains a shutter of heat resisting steel which is operated mechanically with levers by the stroke movement of the probe camera and closes the furnace gap with the probe camera extracted. This mechanism is insensitive to dust and sediments from the furnace. The shutter is pneumatically controlled via a cylinder in the version with a lock chamber: this version is always fitted with an air nozzle.
- The air nozzle is required for cooling the shutter, for ventilating the probe camera housing (prolonging of hold-up time) and for damming up the flue gas with a slight overpressure and/or corrosive flue gas or furnace wall sediments. The air nozzle operates with a minimum overpressure (approx. double the furnace overpressure), so that compressed air is not required.
- The purging air pressure is monitored in an air-tight junction box with connection facilities at the bottom and with push buttons and terminal board (12-pin) so that the probe camera can be retracted in order to protect the camera lens if the probe camera lid has been fastened incorrectly or loosely for example
- Different base plates made of St37 with a connection sleeve (internal diam.120 mm) are available; they are mounted or welded onto the outer wall of the boiler or furnace - initially separately from the retraction device. Base plates without water cooling (up to 60 °C wall temperature) or with water cooling and connection sleeve made of St35 or of a heat-resisting steel alloy are available in 2 different lengths or any length on request.
- The permissible installation inclination with straight viewing is up to 90° downwards or up to 45° upwards. If a 3° inclination downwards is exceeded, the pneumatically operated insertion stop is required to avoid insertion in case of air failure.

Technical data

Retraction device	
Installation positions, referring to horizontal cylinder axis	+3° to +45° or -3° to -90°
Material of base plate/ connection sleeve	St37/St35 or X15CrNiSi2520 (heat-resistant steel)
Version for furnace overpressure	< 3 mbar (partial vacuum design) or < 100 mbar (over pressure design)
Degree of protection (DIN 40050)	IP03, dust-intensive
Temperature of use	
- Partial vacuum design	-20 °C to + 80 °C or -20 °C to + 120 °C
- Over pressure design	-20 °C to + 80 °C
Probe speed	appr. 0,1 m/s
Time for one stroke (insertion / retraction)	appr. 10 s to 15 s with short camera housing
Weight (2GF1712-...)	appr. 90 kg
Working air (compressed air from air unit 2GF1703-...	dry, free of oil and dust, filtered 5 µm filter
Pressure	4 bar to 8 bar angle of camera installation 3° to 15° 6 bar to 8 bar angle of camera installation: > 15°
Length of the cable to the compressed air unit	max. 10 m
Cooling water for version with water-cooled base plate	
Pressure	
- Inlet	0,3 bar to 0,5 bar (max. 4 bar)
- Outlet	0 bar, open outlet (max. 3,5 bar)
Consumption	up to 10 l/min
Outlet water temperature	< 50 °C
Cooling air For version with air nozzle and lock chamber	
Pressure	10 mbar to 200 mbar for version with lock chamber (at least double furnace pressure) 100 mbar to 800 mbar for version with air nozzle
Consumption	appr. 112 m^3/min to 120 m^3/h = 0,2 m^3/min to 2,0 m^3/min
Temperature	30 °C to 50 °C



Retraction Device, Standard

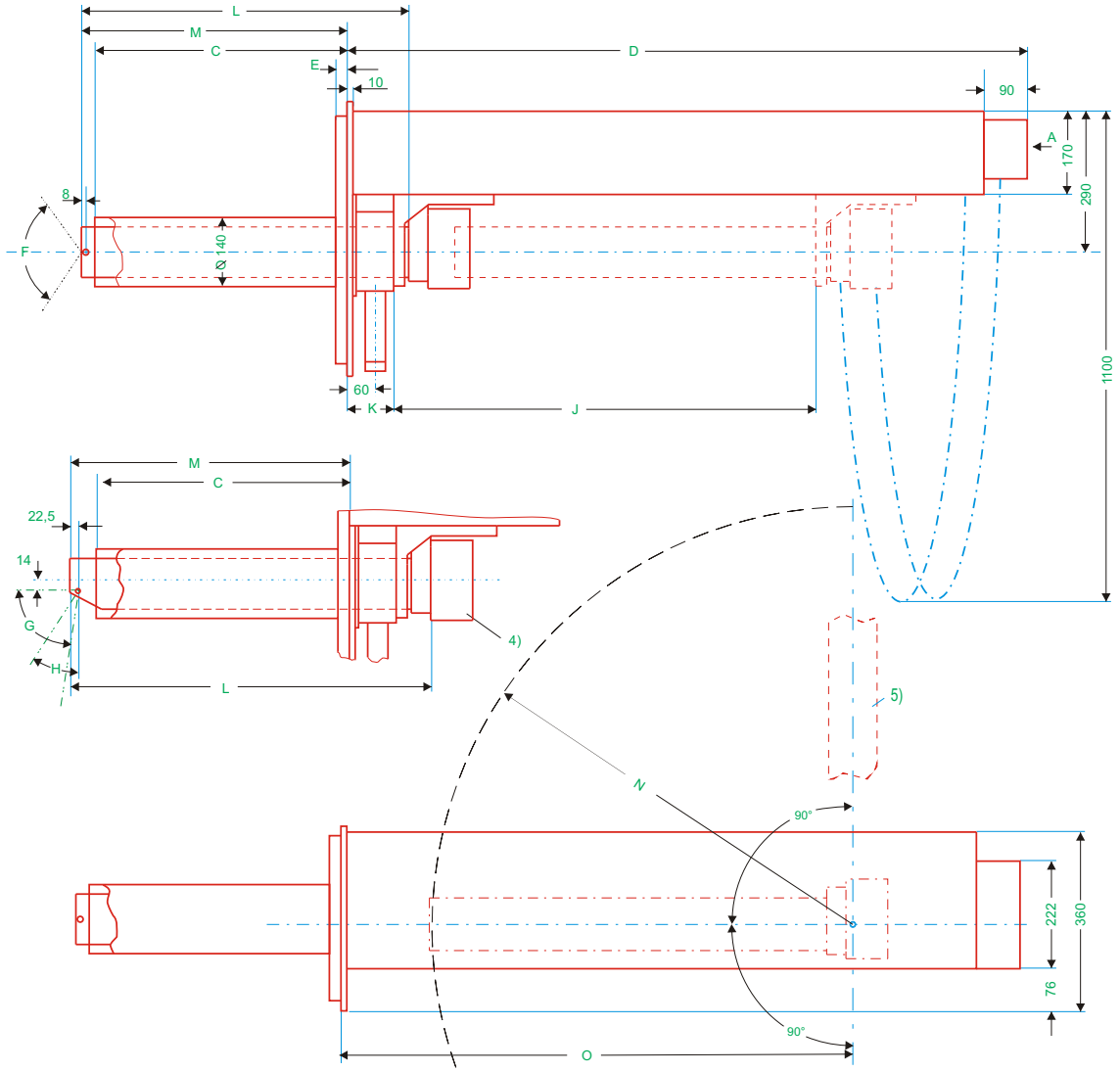
Ordering data

Item	Order no.							
Retraction device	2GF1712	-	☐	☐	☐	☐	☐	-	☐	☐
For furnace pressure < 3 mbar overpressure, (> 0 mbar overpressure: air nozzle required)			|	|	|	|	|		|	|
Chassis			|	|	|	|	|		|	|
- With 750 mm stroke			|	|	|	|	|		|	|
< 80 °C ambient temperature	1		|	|	|	|	|		|	|
< 120 °C ambient temperature	2		|	|	|	|	|		|	|
- With 1050 mm stroke (long probe camera housing neccessary)			|	|	|	|	|		|	|
< 80 °C ambient temperature	3		|	|	|	|	|		|	|
< 120 °C Umgebungstemperatur	4		|	|	|	|	|		|	|
Base plate				|	|	|	|		|	|
- Without base plate				A	|	|	|		|	|
- With base plate (furnace wall temperature < 60 °C)					|	|	|		|	|
St35-sleeve, 520 mm long (with 750 mm stroke)				B	|	|	|		|	|
St35-sleeve, 820 mm long (with 1050 mm stroke)				C	|	|	|		|	|
- With water-cooled base plate					|	|	|		|	|
St35-sleeve 520 mm long (with 750 mm stroke)				E	|	|	|		|	|
St35-sleeve 820 mm long (with1050 mm stroke)				F	|	|	|		|	|
X15-sleeve 520 mm long (with 750 mm stroke)				H	|	|	|		|	|
X15-sleeve 820 mm long (with 1050 mm stroke)				J	|	|	|		|	|
- With base plate in spezial design [1])				Z	|	|	|		|	|
Junction box					|	|	|		|	|
- without junction box					A	|	|		|	|
- with junction box 9/12						|	|		|	|
for ≤ 70 °C ambient temperature					B	|	|		|	|
For > 70 °C ambient temperature with 4 m protection tube					D	|	|		|	|
and additional casing						|	|		|	|
- With junction box 9/12 for > 70 °C ambient temperature						|	|		|	|
4 to 10 m protection tube and additional casing on request						|	|		|	|
Furnace locking						|	|		|	|
- Without shutter						I	|		|	|
With air nozzle						0	|		|	|
With air nozzle for St35 or X15 sleeve						1	|		|	|
- With shutter							|		|	|
without air nozzle						2	|		|	|
With air nozzle for St35 or X15 sleeve						3	|		|	|
With air nozzle for ceramic sleeve						4	|		|	|
Insertion stop							|		|	|
- Without insertion stop							0		|	|
- With insertion stop							1		|	|
(necessary from 3° inclination downwards)									|	|
Limit switch for purging air stop									|	|
- Without limit switch								-	0	|
- With limit switch								-	1	|
(max. 80 °C amb. Temperature, purging valve in compressed air unit 2GD1703-... necessary)										|
Tubes and cables										|
- Without tubes and cables								-		A
- With tube- and cable set D22 [2])										F
(without installation tube set)								-		|
- With installation tube set [3])								-		G

[1]) On request (for example ceramic sleeve)

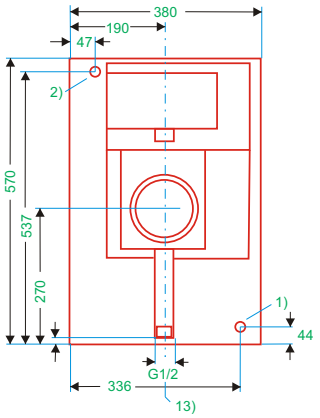
[2]) Tube and cable set D22 consisting of: 1 purging air tube D22 (M28), length 2 m, 2 cooling water tubes (12 mm diam, / 2m) 1 signal cable, thermo cable for temperature monitoring inside probe, length: 2,8 m.

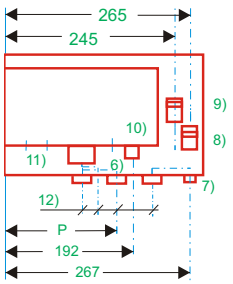
[3]) Installation tube set 2GF1801-8FC, consisting of : 3 air tubes (8 mm diam./2 m, for working air ‘insertion’, working air ‘retraction’ and purging air inlet), 2 cooling water tubes (12 mm diam./2 m, cooling water inlet and outlet for probe camera housing) and also two screwed glands, R 1/2”.



Dimen-sions (mm) or angle	Explanation	Short probe camera housing viewing direction straight	Short probe camera housing viewing direction elbow	Long probe camera housing viewing direction straight	Long probe camera housing viewing direction elbow
C	Lenght of sleeve	< 520	<520	<820	<820
D	Total length from base plate	1300	1300	1600	1600
E	With water cooled base palte	23	23	23	23
F	Diagonal angle of view	< 110°	-	<110°	-
G	Viewing direction angle	-	70°	-	70°
H	Vertical angle of view (horizontal = 58°)	-	45°	-	45°
J	Stroke length	750	750	1050	1050
K	With air nozzle (otherwise: 10)	96	96	96	96
L	Length from stop	673	695	973	995
M	Insertion depth from base plate	528	550	828	850
N	Pivoting radius	700	725	1000	1025
O	-	952	952	1252	1252
P	Viewing direction straight, upwards, right or left	167	167	167	167
P	Viewing direction downwards	-	92	-	92

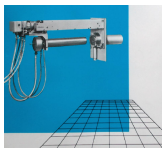
1) Cooling water inlet for base palte 1/2” female thread
2) Cooling water outlet for base plate 3/4” female thread
3) Probe camera housing with straight view direction
4) Probe camera housing with elbow view direction
5) Service position of the camera housing (90° to the left or right)





6) Cooling water inlet for probe camera housing (ferrule screw gland for 12 mm outer diameter).
7) Cooling water outlet for probe camera housing (ferrule screw gland for 12 mm outer diameter)
8) Working air for retraction process (screwed gland for tube with 8 mm outer diameter)
9) Working air for probe’s insertion (screwed gland for tube with 8 mm outer diameter)
10) Purging air inlet (screwed gland for tube with 8 mm oter diameter)
11) Screwed glands for cable diameter 6 - 9 mm or 12 - 14 mm
12) Connections for cooling water and purging air to probe camera housing
13) Cooling air connection of the nozzle R 1 1/2”, male thread

Dimensions, retraction device 2GF1712-...

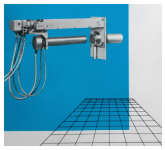


Lock Chamber for Retraction Device

Lock Chamber for Retraction Device

- The lock chamber enables operation of the furnace camera system in combination with firing processes which operate under over pressure conditions up to 100 mbar
- The lock camber is hermetically closed and provided with flap system which seals off the camera housing to ambiency. Thus offers insertion or retraction of probe camera under operation conditions of the firing process (e.g. pressure boiler).

  Due to special design of the lack chamber system, leakage of hot flue gases is being prevented safely, during control of the retraction device.
- Two additional special OD-seals with sealing lip encircle camera probe housing in the area of the retraction port of the lock chamber.
- Drive of lock chambers flap is performed via a pneumatic cylinder. A pneumatic position switch detects flap position and releases control of the retraction device, after it is totally closed.
- In case of control air failure, a retraining spring secures safe cose of the lock chamber.
- Via a nozzle cooling- respectively barrier air is connected to the chamber system.
- The lock chamber is installed to a sub plate and may be screwed to the main base plate (also water cooled version). Stud bolts on the sub plate allow fast and easy fixing of the retraction device.
- The lock chamber is designed ‘sea water resistant’.



Retraction Device with Lock Chamber

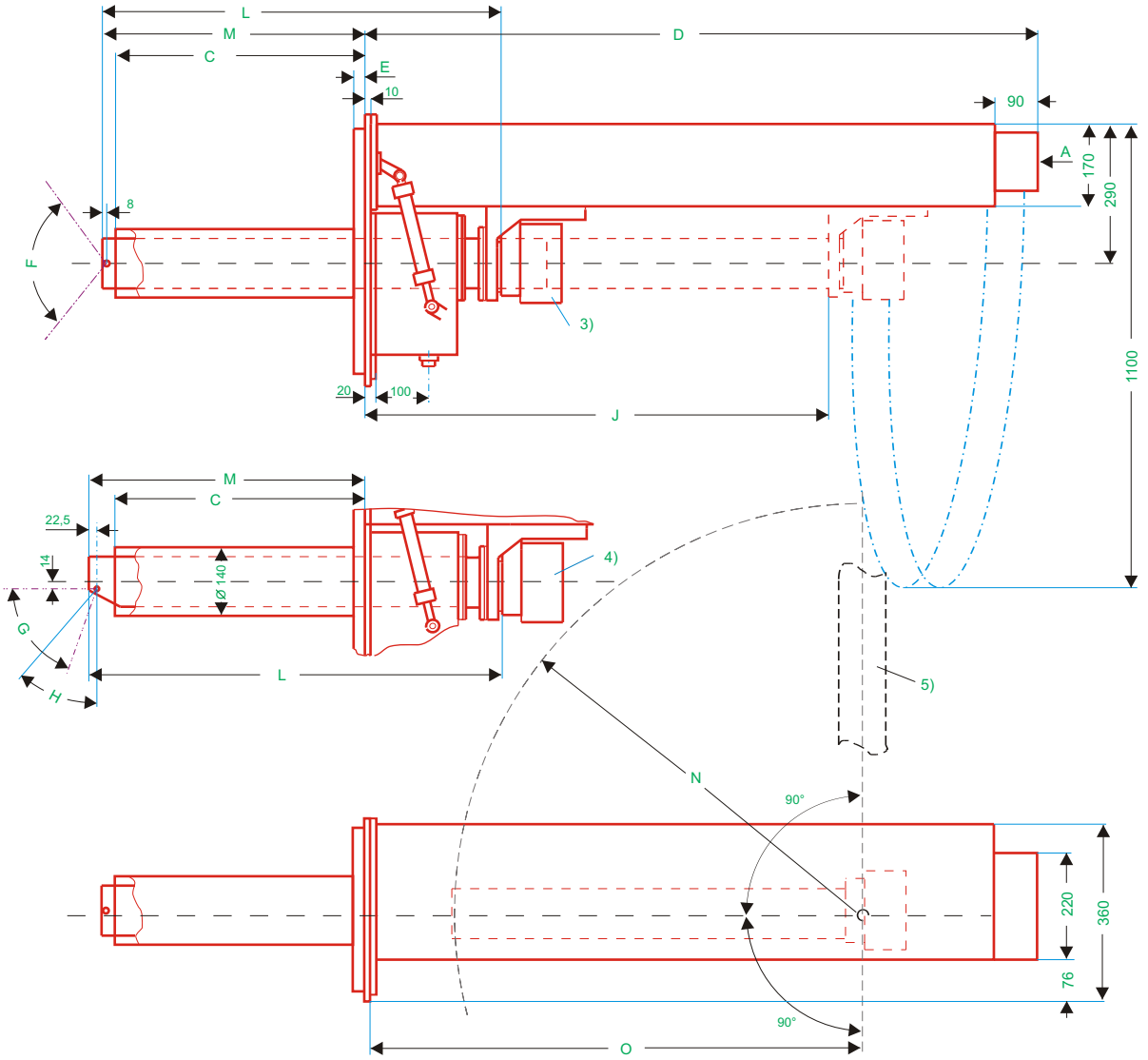
Ordering data

Item	Order no.								
Retraction device	2GF1713	-	☐	☐	☐	☐	☐	-	☐	☐
For furnace pressure < 100 mbar overpressure, including lock chamber with shutter and air nozzle for ambient temperature < 80 °C			|	|	|	|	|		|	|
Chassis			|	|	|	|	|		|	|
- With 750 mm stroke			5	|	|	|	|		|	|
- With 1050 mm stroke			6	|	|	|	|		|	|
(long probe housing required)				|	|	|	|		|	|
Base plate				|	|	|	|		|	|
- Without base plate				A	|	|	|		|	|
- With base plate (furnace wall temperature < 60 °C)					|	|	|		|	|
St35-sleeve, 520 mm long (with 750 mm stroke)				B	|	|	|		|	|
St35-sleeve, 820 mm long (with 1050 mm stroke)				C	|	|	|		|	|
- With water-cooled base plate					|	|	|		|	|
St35-sleeve 520 mm long (with 750 mm stroke)				E	|	|	|		|	|
St35-sleeve 820 mm long (with1050 mm stroke)				F	|	|	|		|	|
X15-sleeve 520 mm long (with 750 mm stroke)				H	|	|	|		|	|
X15-sleeve 820 mm long (with 1050 mm stroke)				J	|	|	|		|	|
- With base plate in spezial design [1])				Z	|	|	|		|	|
Junction box					|	|	|		|	|
- without junction box					A	|	|		|	|
- with junction box 9/12						|	|		|	|
for ≤ 70 °C ambient temperature					B	|	|		|	|
For > 70 °C ambient temperature with 4 m protection tube					D	|	|		|	|
and additional casing						|	|		|	|
- With junction box 9/12 for > 70 °C ambient temperature						|	|		|	|
4 to 10 m protection tube and additional casing on request						|	|		|	|
Insertion stop						|	|		|	|
- Without insertion stop						0	0		|	|
- With insertion stop						1	1		|	|
(necessary from 3° inclination downwards)									|	|
Limit switch for purging air stop									|	|
- Without limit switch								-	0	|
- With limit switch								-	1	|
(max. 80 °C amb. Temperature, purging valve in compressed air unit 2GD1703-... necessary)										|
Tubes and cables										|
- Without tubes and cables								-		A
- With tube- and cable set D22 [2])										F
(without installation tube set)								-		
- With installation tube set [3])								-		G

[1]) On request (for example ceramic sleeve)

[2]) Tube and cable set D22 consisting of: 1 purging air tube D22 (M28), length 2 m, 2 cooling water tubes (12 mm diam, / 2m) 1 signal cable, thermo cable for temperature monitoring inside probe, length: 2,8 m.

[3]) Installation tube set 2GF1801-8FC, consisting of : 3 air tubes (8 mm diam./2 m, for working air ‘insertion’, working air ‘retraction’ and purging air inlet), 2 cooling water tubes (12 mm diam./2 m, cooling water inlet and outlet for probe camera housing) and also two screwed glands, R 1/2”.



Dimen-sions (mm) or angle	Explanation	Short probe camera housing viewing direction straight	Short probe camera housing viewing direction elbow	Long probe camera housing viewing direction straight	Long probe camera housing viewing direction elbow
C	Lenght of sleeve	< 520	<520	<820	<820
D	Total length from base plate	1300	1300	1600	1600
E	With water cooled base palte	23	23	23	23
F	Diagonal angle of view	< 110°	-	<110°	-
G	Viewing direction angle	-	70°	-	70°
H	Vertical angle of view (horizontal = 58°)	-	45°	-	45°
J	Stroke length	750	750	1050	1050
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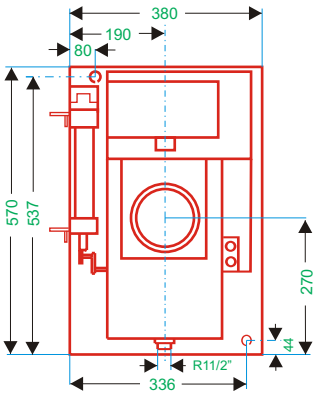
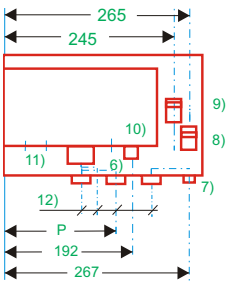
M	Insertion depth from base plate	528	550	828	850
N	Pivoting radius	700	725	1000	1025
O	-	952	952	1252	1252
P	Viewing direction straight, upwards, right or left	167	167	167	167
P	Viewing direction downwards	-	92	-	92

1) Cooling water inlet for base palte 1/2” female thread
2) Cooling water outlet for base plate 3/4” female thread
3) Probe camera housing with straight view direction
4) Probe camera housing with elbow view direction
5) Service position of the camera housing (90° to the left or right)

View A



Connection board



6) Cooling water inlet for probe camera housing (ferrule screw gland for 12 mm outer diameter).
7) Cooling water outlet for probe camera housing (ferrule screw gland for 12 mm outer diameter)
8) Working air for retraction process (screwed gland for tube with 8 mm outer diameter)
9) Working air for probe’s insertion (screwed gland for tube with 8 mm outer diameter)
10) Purging air inlet (screwed gland for tube with 8 mm oter diameter)
11) Screwed glands for cable diameter 6 - 9 mm or 12 - 14 mm
12) Connections for cooling water and purging air to probe camera housing
13) Cooling air connection of the nozzle R 1 1/2”, male thread

Dimensions, retraction device 2GF1713-...