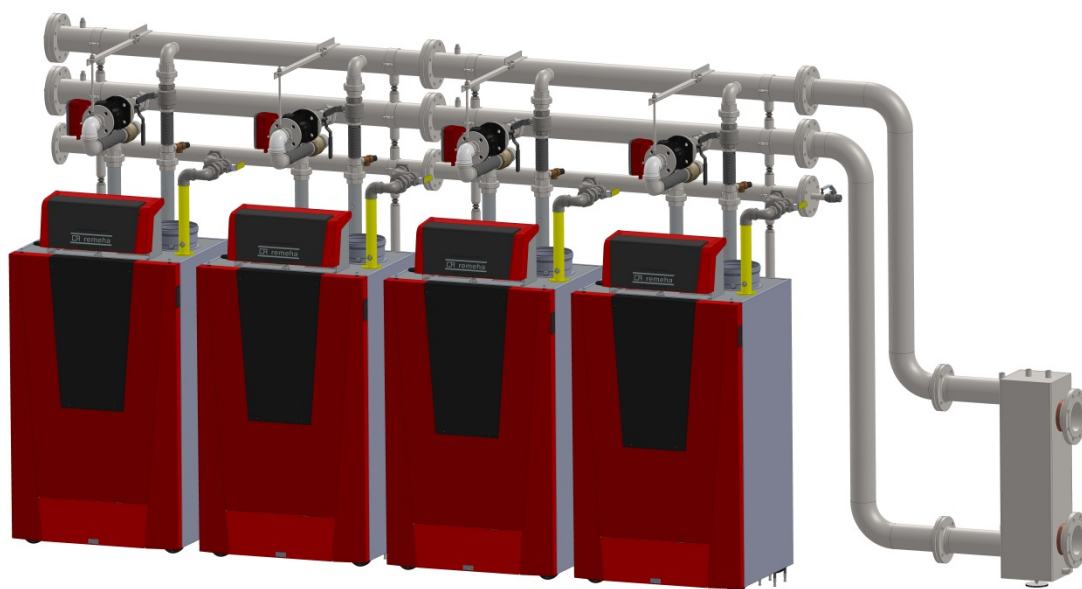


Gas 220 Ace – Cascade Assembly Manual



Dear Customer,

Thank you very much for buying this appliance.

Please read through the manual carefully before using the product, and keep it in a safe place for later reference. In order to ensure continued safe and efficient operation we recommend that the product is serviced regularly. Our service and customer service organisation can assist with this. We hope you enjoy years of problem-free operation with the product.

All technical and technological information contained in these technical instructions, as well as any drawings and technical descriptions supplied, remain our property and shall not be multiplied without our prior consent in writing. Subject to alterations

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Safety Liabilities

Manufacturer's Liability

Our products are manufactured in compliance with the requirements of the various Directives applicable. In the interests of the quality of our products, we strive constantly to improve them. We therefore reserve the right to modify the specifications given in this document.

Our liability as manufacturer may not be invoked in the following cases:

- Failure to abide by the instructions on installing the Cascade system / Appliance.
- Failure to abide by the instructions on using the appliance.
- Adjustment or disassembly of factory made threaded joints.
- Faulty or insufficient maintenance of the Cascade system and appliance.

Installer's liability

The installer is responsible for the installation and initial commissioning of the appliance. The installer must observe the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance and cascade kit.
- Install the appliance and cascade kit in compliance with prevailing legislation and standards.
- Carry out initial commissioning and any checks necessary.
- Explain the installation to the user.
- If maintenance is necessary, warn the user of the obligation to check the appliance and keep it in good working order.
- Give all the instruction manuals to the user.

User's liability

To guarantee optimum operation of the system, you must abide by the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance and cascade kit
- Call on a qualified professional to carry out installation and initial commissioning.
- Get your installer to explain your installation to you.
- Have the required inspections and maintenance carried out by a qualified installer.
- Keep the instruction manuals in good condition close to the appliance.

General Information

This technical information contains useful and important details for the proper dimensioning of a cascade system with floor standing boilers. The description includes the correct use of the complete Remeha cascade system with Gas 220 Ace modulating floor standing boilers

This manual describes the installation and assembly, of the Gas 220 Ace cascade kits.

In order to make various Gas 220 boilers configurations, Remeha offer several cascade kits. The compact design of the boilers, combined with the gas and water connection technology of the cascade system, makes it possible to install a high heat output in a small area.

When installing two to eight Gas 220 Ace boilers, the cascade kits include components that are very comprehensive and easy to install. The hydraulic and gas system can be put together entirely without welding, using screw connections, and flanges.

Important

Please contact us if you have any questions or further information about cascade configurations.

Cascade Configuration

In many situations it is advantageous to spread the total required heat output over several boilers. This can be made possible by means of a "cascade configuration". In a cascade configuration, heating boilers are connected hydraulically. If the heat demand increases or decreases, boilers are switched on or off respectively by the external controller (*BMS etc supplied by others*). It is then important to determine the ideal number of boilers for the cascade. The following factors need to be taken into account when deciding on the number of boilers:

Reliability:

- Reliability increases with the number of boilers. Research has shown that reliability is already optimum for systems with four boilers in a cascade

Arrangement:

- The compact units and therefore compact configuration means that you have more flexibility for potential boiler locations.

Adjustment:

- When using several boilers and modulating control, the heat output offered is virtually equal to the heat output requested.

Hydraulic isolation: low loss header

Practical experience has shown that it is beneficial to create hydraulic isolation between the boiler circuit and the system circuit using a low-loss header. This means that a widely varying volume flow on the system side hardly influences the volume flow on the boiler side at all. This also applies in reverse: a widely varying volume flow on the boiler side hardly influences the volume flow on the system side at all. Controlling several different groups hydraulically is therefore significantly easier as they do not, or barely, influence each other. This creates better overall operating conditions for the system.

Gas 220 Ace cascade kits

Structure of the Gas 220 Ace cascade kits

Kits up to 1250kW

The flow, return and gas connections of the individual Gas 220 Ace boilers up to 1250 kW are connected by means of pipe kits to main collectors for flow, return and gas. These collectors can be supported by floor stands that rest on the floor or can be secured to the wall by the installer.

The low loss header supplied is connected to the DN100 flow/return collectors by the means of the swan neck flow/return pipes. The low loss header has DN125 flange **system** connections. On the **boiler side**, the DN100 flange connections can be fitted to the left or right of the cascade main collectors as required. The DN100 blind flanges (supplied) are then fitted on the opposite side.

The gas main collector has a DN65 flange to which the main network gas pipe can also be connected on the left or right as required. The DN65 blind flange supplied is then fitted on the opposite side.

Flange details (for systems <1250kW)

DN100 Flow and return flanges details:	PN16 EN 1092 – 1 flange
DN65 Gas Pipe flange details:	PN16 EN 1092 – 1 flange
DN125 Secondary flow and return on low loss Header flanges details:	PN16 EN 1092 – 1 flange

Kits from 1250kW to 2400kW

For higher output cascade systems (kW >1250) the Gas 220 Ace boilers are connected by means of pipe kits to main collectors for flow, return and gas. These collectors can be supported by floor stands that rest on the floor or can be secured to the wall by the installer.

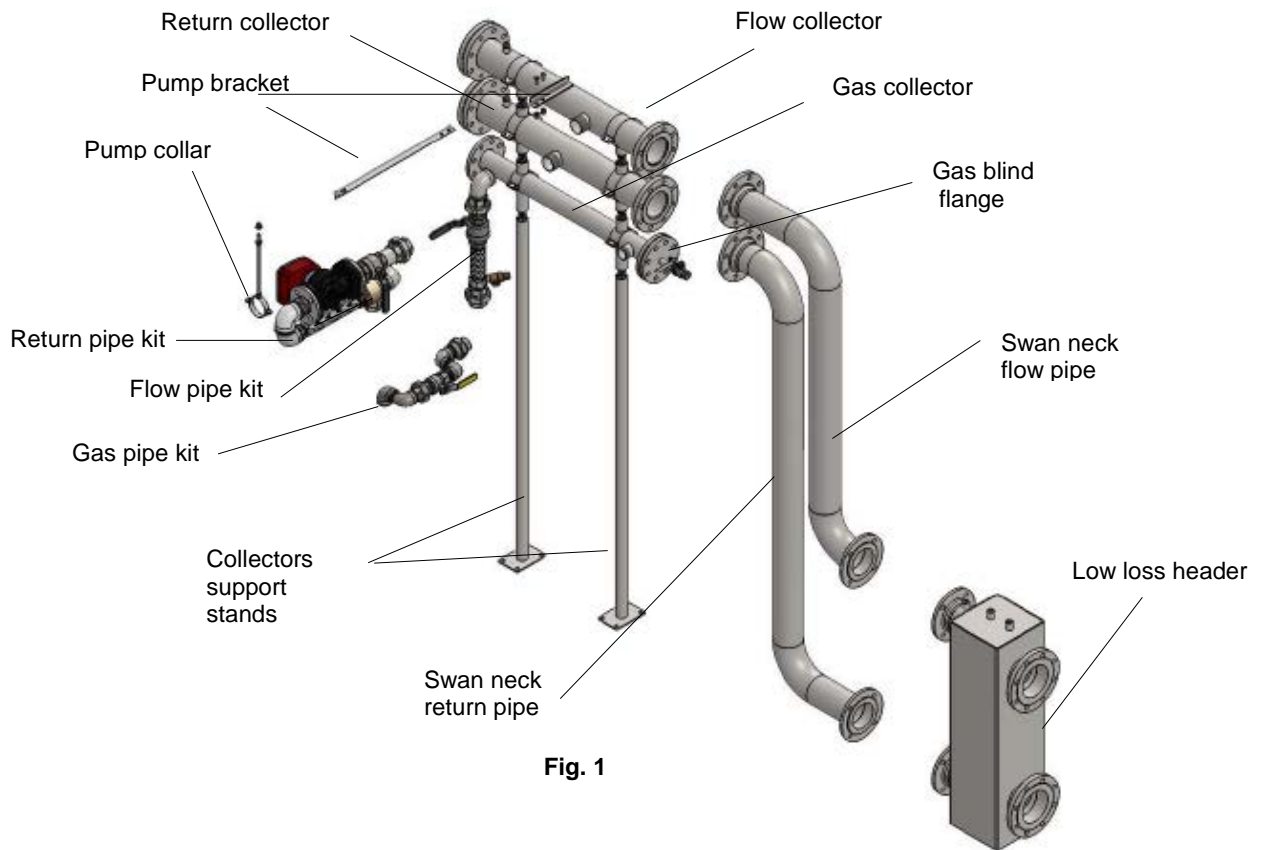
The low loss header supplied is connected to the DN150 flow/return collectors by the means of the swan neck flow/return pipes. The low loss header has DN 200 flange **system** connections. On the boiler side, the DN150 flange connections can be fitted to the left or right of the cascade main collectors as required. The DN150 blind flanges (supplied) are then fitted on the opposite side.

The gas main collector has a DN100 flange to which the main network gas pipe can also be connected on the left or right as required. The DN100 blind flange supplied is then fitted on the opposite side.

Flange details for larger output cascade systems (kW Outputs >1250)

DN150 Flow and return flanges details:	PN16 EN 1092 – 1 flange
DN100 Gas Pipe flange details:	PN16 EN 1092 – 1 flange
DN200 Secondary flow and return on low loss Header flanges details:	PN16 EN 1092 – 1 flange

General view of Cascade Kit

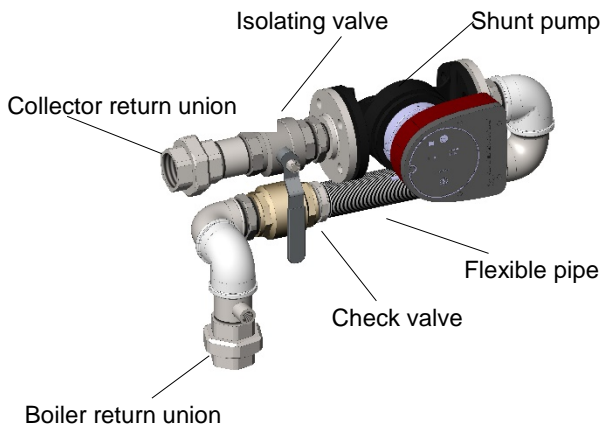


Boiler Pipe kits

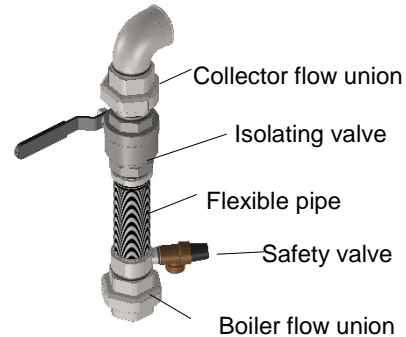
The boiler pipe kits are designed to allow a quick connection to the boiler and collectors by means of unions provided at each end. In addition, the flow and return pipe kits are provided with corrugated flexible pipe sections that allow for small miss-alignments and make site installation easier.

The factory made threaded joints are sealed with a hard setting compound. Adjustment of these joints will break the seal and invalidate the warranty.

Return pipe kit



Flow pipe kit



Gas pipe kit

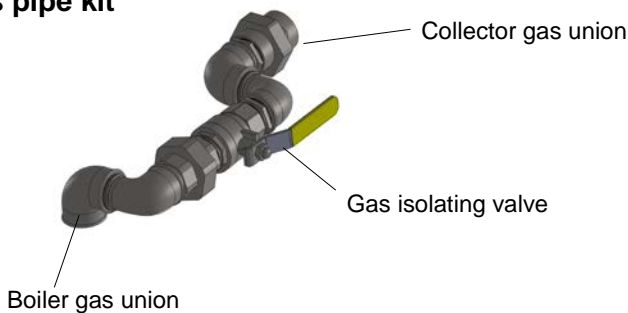


Fig. 2

A Grundfos Magna 1 40-60 F shunt pump is fitted on the return pipe kit. The pump selection takes into consideration the boiler resistance and the pipework resistance to the low loss header at a 20C flow/return temperature differential.

A check valve is fitted between boiler and pump and an isolating valve is fitted between pump and return collector.

A pressure relief valve and an isolating valve are fitted on the flow pipe kit,.

The gas pipe kit has no flexible pipe, but the collector position relative to the boiler position can be adjusted due to the flexible pipes fitted on the Flow and Return pipe kits. An isolation valve is provided on the Gas pipe kit.

Assembly instructions

Use the guidelines and the required installation space as a basis for determining the correct place to install the boilers.

Ensure that there is sufficient space around the boiler for good access and ease of maintenance. Refer to Installation, User and service manual for minimum clearances for the boiler. Follow all the installation instructions as presented in the **Gas 220 Ace Installation, user and service manual**,

supplied with the boiler. (Further copies can be downloaded by visiting the company website: remeha.co.uk)

1. Rest the flow and return collectors on the floor at approx. 240mm distance between the axis. If the Collectors floor support stand is required, it must be mounted at this stage and it will also be used for adjusting the distance between collectors. Do not tighten the collector's brackets at this stage.
2. Fit the Flow pipe kit to the Flow collector and fasten the flow half union onto the collector connection using the 2" gasket provided in the kit. Make sure that the isolating valve lever is in the desired position before tightening the union .
3. Fit the return pipe kit to the return collector and fasten the return half union onto the collector connection using the 2" gasket provided in the kit.
4. If the Collectors floor support stand is required, the Gas collector must also be positioned into the brackets. The approx. distance between the axis of the return collector and gas collector is 238mm.
5. Fit the Gas pipe kit to the Gas collector and fasten the gas half union onto the collector connection using the 1.5" gasket provided in the kit.
6. Raise the collectors and the collectors support stand assembly into position.
7. If the collector's floor support stand is not required, fix the collectors to the wall. Make sure that it is a solid wall, capable of bearing the collectors weight.
8. Position the Gas collector so that the Gas pipe kits will align with the boiler **Gas connection**.
9. Undo the 1.5" union positioned before the gas isolating valve and fit the 1.5" elbow Gas pipe kit section using a thread sealant* onto the boiler **Gas connection** and fasten into position. Fasten the gas union.
10. Position the flow and return collectors so that the flow and return pipe kits will align with the boiler CH flow and CH return and will allow the connections with the pipe kit unions;
11. Fasten the Flow pipe kit union to the boiler CH flow using a thread sealant* and fasten the union;
12. Fasten the Return pipe kit union to the boiler CH return using a thread sealant* and fasten the union;
13. Check the position of the flow and return collectors and check with a spirit level that they are horizontal. Make the necessary adjustments and tighten the collector's brackets. Due to the flexible pipes, small misalignments can be accommodated.
14. Position the pump bracket onto the flow collector pump bracket section using the M10 screws, washers and nuts provided in the kit and adjust the position so that the pump collar to be mounted between the elbow and the pump flange. Mount the collar and make the necessary length adjustment of the threaded rod so that the weight of the pump to be sustained by the pump bracket.

15. Mount the swan neck flow and return pipes to the Flow and Return collectors using the gaskets and the sixteen M16 screws, nuts and washers, provided with the kit. **Do not tighten the nuts at this stage because some small adjustments might be necessary to align the swan neck pipes with the low loss header.**
16. Check with a spirit level if the swan neck collectors are vertical. Make the necessary adjustments.
17. Position the Low loss header and make the necessary adjustment using the adjustment stud. The flow and return flanges must be aligned with the swan neck pipe flanges.
18. Connect the flow and return flanges using the gaskets and the eight M16 screws, nuts and washers, provided in the kit. Tighten the nuts beginning with the horizontal collector flanges and ending with the Low loss header flanges.
19. Make a final visual inspection of all joints and pipe work.

* Pipe sealant complying to BS EN 751

Adapter kit for Gas 220 Ace 160 boilers

The pipe kits are designed for the Gas 220 Ace **200**, Gas 220 Ace **250** and Gas 220 Ace **300** boilers. These boilers have R 2" male thread flow/return connections and R 1 1/2" male thread gas connection. The Gas 220 Ace **160** boiler has R 1 1/4" male thread flow/return connections and R 1" male thread gas connection.

For the Gas 220 Ace 160 boiler an adapter kit is available.

Adapter kit for Flow and Return pipe kits

The adapter kit consists of two 2" Male x 1 1/2" Female Thread Reducer Bushing Pipe Fittings.

Flow pipe kit

Return pipe kit

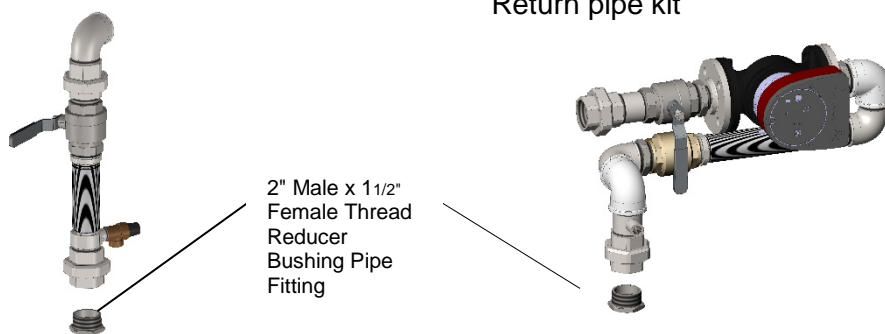


Fig.3

Prior to connect the flow and return pipe kits to the Boiler **CH flow** and **CH return**, fasten the 2" Male x 1 1/2" Female Thread Reducer Bushing Pipe Fittings into the flow and return pipe kits using a thread sealant.

The flexible pipe will accommodate small misalignments.

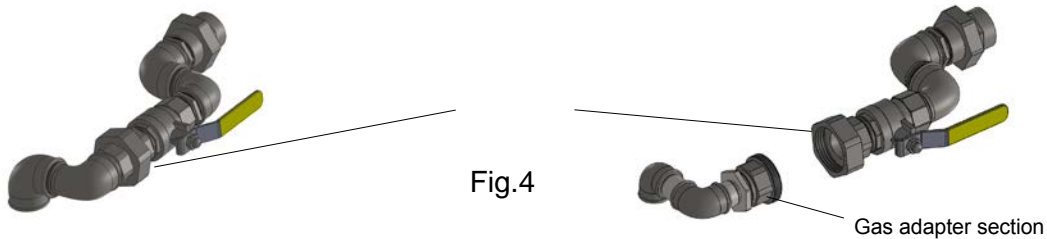
Adapter kit for Gas pipe kit

The adapter kit consists of a 1" pipe-work section that will replace the equivalent 1 1/2" pipe-work section from the standard kit.

The replacement section has a 2" half union that will allow the connection to the standard gas pipe kit section connected to the gas collector. See following page for further information.

Standard gas pipe kit

Gas kit adapter



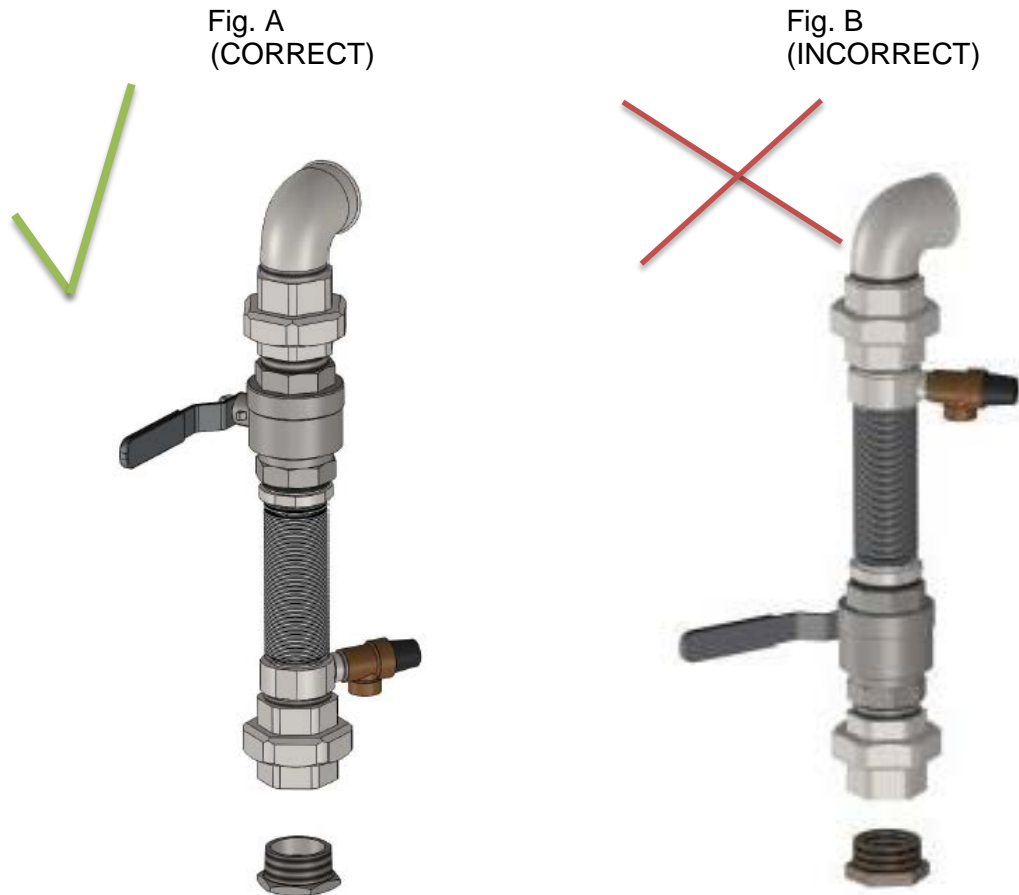
Fasten the Gas adapter section to the Boiler gas connection using a thread sealant*.

Connect the half union of the gas adapter section to the half union of the standard gas pipe kit section, connected to the gas collector.

* Pipe sealant complying with BS EN 751

IMPORTANT NOTICE

Before fitting the **Flow pipe kit** to the Flow collector please check that the **Safety valve** is mounted in the correct position. The Safety valve must be positioned after the Boiler flow union. The safety valve shall not be positioned after an isolating valve.



If the **Safety valve** is positioned in error, as per fig.B, before connecting the **Flow pipe kit** to the Flow collector, you must undo the Boiler flow union and the Collector flow union and reverse the isolating valve-flexible pipe-safety valve assembly, as per fig A. The two half unions have the same 2" size and can be threaded onto the 2" half unions from the boiler connection and collector connection.

Connecting the boiler circulating pump

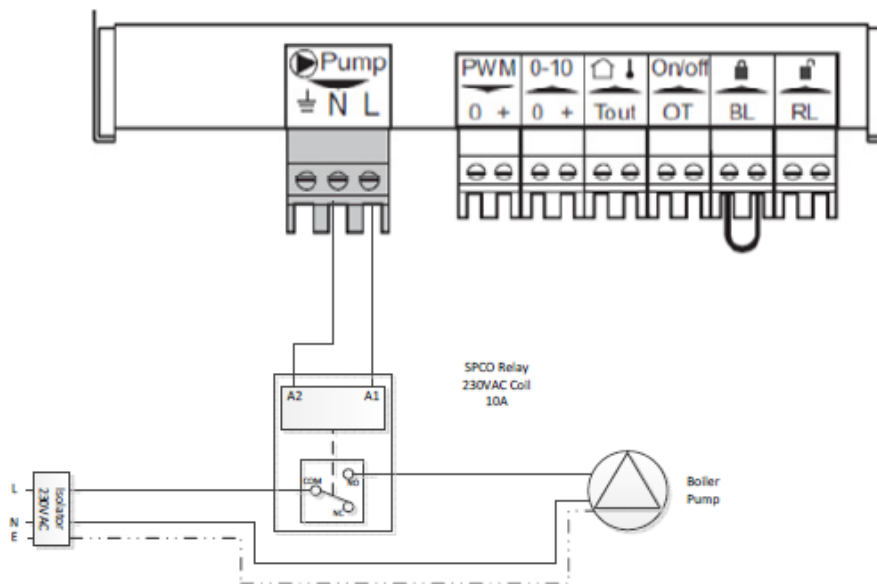
The boiler circulating pump is a Grundfos Magna 1 40-60 F. The maximum power consumption of the pump is 194 watts (Maximum 1.56A) 230V 50Hz. The pump must be connected via a pump relay/ contactor (supplied loose).

Wiring Connections to the boiler pump

The supplied Grundfos Magna 1 40 – 60F pump must be connected to the boiler via a pump relay / contactor. The “switching signal to the relay / contactor” is supplied by the connections marked “pump” (see below) important note, the maximum power consumption is 300VA. The pump power supply must be wired to a suitable sized fused spur.

The location of the standard PCB can be found within the top mounted control panel fitted to the boiler.

Typical example of wiring a relay / pump contactor to the Gas 220 Ace boiler panel



Pre Boiler Commissioning

Warning : Initial commissioning must be done by a qualified professional.

The cascade kits are pressure tested in the factory before delivery, however due to a number of joints made during the assembly it's required that a further pressure test is carried-out on completion of the assembly of the hydraulic pipework.

Complete a gas strength / soundness test of the gas circuit including the Gas collector connections in accordance with **IGE/UP/1A**.

Commissioning

Follow the commissioning procedure from chapter 7 of the **Gas 220 Ace Installation, user and service manual**.

Reference Guide

Gas 220 Ace Cascade Pipe Size Matrix

The cross over point from using **DN100** pipe kits to **DN150** pipe kits is when the total heat output is above 1250kW. Total boiler outputs below 1250kW will use the DN100 Kits.

No of Boilers	Total KW	In Line Kits	Remeha Kit Reference	Items Supplied in Kit.
1 X Gas 220 - 160	152.1	DN 100	KTSGA1L	LLH10+1GA10+160ADAP
1 X Gas 220 - 200	194.4	DN 100	KTSGA1L	LLH10+1GA10
1 X Gas 220 - 250	243.3	DN 100	KTSGA1L	LLH10+1GA10
1 X Gas 220 - 300	290.9	DN 100	KTSGA1L	LLH10+1GA10
2 X Gas 220 - 160	304.2	DN 100	KTSGA2L	LLH10+2GAL10+(2X160ADAP)
2 X Gas 220 - 200	388.8	DN 100	KTSGA2L	LLH10+2GAL10
2 X Gas 220 - 250	486.6	DN 100	KTSGA2L	LLH10+2GAL10
2 X Gas 220 - 300	581.8	DN 100	KTSGA2L	LLH10+2GAL10
3 X Gas 220 - 160	456.3	DN 100	KTSGA3L	LLH10+1GA10+2GAL10+(3X160ADAP)
3 X Gas 220 - 200	583.2	DN 100	KTSGA3L	LLH10+1GA10+2GAL10
3 X Gas 220 - 250	729.9	DN 100	KTSGA3L	LLH10+1GA10+2GAL10
3 X Gas 220 - 300	872.7	DN 100	KTSGA3L	LLH10+1GA10+2GAL10
4 X Gas 220 - 160	608.4	DN 100	KTSGA4L	LLH10+2GAL10+2GAL10+(4X160ADAP)

4 X Gas 220 - 200	777.6	DN 100	KTSGA4L	LLH10+2GAL10+2GAL10
4 X Gas 220 - 250	973.2	DN 100	KTSGA4L	LLH10+2GAL10+2GAL10
4 X Gas 220 - 300	1163.6	DN 100	KTSGA4L	LLH10+2GAL10+2GAL10
5 X Gas 220 - 160	760.5	DN 100	No Kit reference	LLH10+1GA10+2GAL10+2GAL10+(5x160ADAP)
5 X Gas 220 - 200	972.0	DN 100	No Kit reference	LLH10+1GA10+2GAL10+2GAL10
5 X Gas 220 - 250	1216.5	DN 100	No Kit reference	LLH10+1GA10+2GAL10+2GAL10
6 X Gas 220 - 160	912.6	DN 100	No Kit reference	LLH10+2GAL10+2GAL10+2GAL10+6x160ADAP
6 X Gas 220 - 200	1166.4	DN100	No Kit reference	LLH10+2GAL10+2GAL10+2GAL10
7 X Gas 220 - 160	1064.7	DN 100	No Kit reference	LLH10+1GA10+2GAL10+2GAL10+2GAL10 +(7 x 160ADAP)

Number of Boilers	Total KW	In Line Kits	Remeha Kit Reference	Items Supplied in Kit.
5 X Gas 220 - 300	1455	DN 150	No Kit reference	LLH15+1GA15+2GAL15+2GAL15
6 X Gas 220 - 250	1500	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15
6 X Gas 220 - 300	1745	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15
7 X Gas 220 - 200	1361	DN 150	No Kit reference	LLH15+1GAL15+2GAL15+2GAL15+2GAL15
7 X Gas 220 - 250	1703	DN 150	No Kit reference	LLH15+1GAL15+2GAL15+2GAL15+2GAL15
7 X Gas 220 - 300	2036	DN 150	No Kit reference	LLH15+1GAL15+2GAL15+2GAL15+2GAL15
8 X Gas 220 - 160	1217	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15+2GAL15+ (8 x 160ADAP)
8 X Gas 220 - 200	1555	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15+2GAL15
8 X Gas 220 - 250	1946	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15+2GAL15
8 X Gas 220 - 300	2327	DN 150	No Kit reference	LLH15+2GAL15+2GAL15+2GAL15+2GAL15
2 X Elbows 90deg	NA	DN 150	TSDN159EL	Optional Extra

Back to Back Cascade DN100 and DN150

Number of Boilers	Total KW	Back to Back Kits	Remeha Kit Reference	Items Supplied in Kit.
2 X Gas 220 - 160	304.2	DN 100	KTSGA2B	LLH10+2GAB10+(2X160ADAP)
2 X Gas 220 - 200	388.8	DN 100	KTSGA2B	LLH10+2GAB10
2 X Gas 220 - 250	486.6	DN 100	KTSGA2B	LLH10+2GAB10
2 X Gas 220 - 300	581.8	DN 100	KTSGA2B	LLH10+2GAB10
3 X Gas 220 - 160	456.3	DN 100	KTSGA3B	LLH10+1GA10+2GAB10+(3X160ADAP)
3 X Gas 220 - 200	583.2	DN 100	KTSGA3B	LLH10+1GA10+2GAB10
3 X Gas 220 - 250	729.9	DN 100	KTSGA3B	LLH10+1GA10+2GAB10
3 X Gas 220 - 300	872.7	DN 100	KTSGA3B	LLH10+1GA10+2GAB10
4 X Gas 220 - 160	608.4	DN 100	KTSGA4B	LLH10+2GAB10+2GAB10+(4X160ADAP)
4 X Gas 220 - 200	777.6	DN 100	KTSGA4B	LLH10+2GAB10+2GAB10
4 X Gas 220 - 250	973.2	DN 100	KTSGA4B	LLH10+2GAB10+2GAB10
4 X Gas 220 - 300	1163.6	DN 100	KTSGA4B	LLH10+2GAB10+2GAB10
5 X Gas 220 - 160	760.5	DN 100	KTSGA5B1 60-250	LLH10+1GA10+2GAB10+2GAB10+(5x160ADAP)
5 X Gas 220 - 200	972.0	DN 100	KTSGA5B1 60-250	LLH10+1GA10+2GAB10+2GAB10
5 X Gas 220 - 250	1216.5	DN 100	KTSGA5B1 60-250	LLH10+1GA10+2GAB10+2GAB10
6 X Gas 220 - 160	912.6	DN100	KTSGA6B1 60-200	LLH10+2GAB10+2GAB10+2GAB10+(6x160ADAP)
6 X Gas 220 - 200	1166.4	DN100	KTSGA6B1 60-200	LLH10+2GAB10+2GAB10+2GAB10
7 X Gas 220 - 160	1064.7	DN100	KTSGA7B1 60	LLH10+1GAB10+2GAB10+2GAB10+2 GAB10+(7 X 160 ADAP)

Number of Boilers	Total KW	Back to Back Kits	Remeha Kit Reference	Items Supplied in Kit.
5 X Gas 220 - 300	1455	DN 150	KTSA5B300	LLH15+1GA15+2GAB15+2GAB15
6 X Gas 220 - 250	1500	DN 150	KTSGA6B250-300	LLH15+2GAB15+2GAB15+2GAB15
6 X Gas 220 - 300	1745	DN 150	KTSGA6B250-300	LLH15+2GAB15+2GAB15+2GAB15
7 X Gas 220 - 200	1361	DN 150	KTSGA7B200-300	LLH15+1GA15+2GAB15+2GAB15+2GAB15
7 X Gas 220 - 250	1703	DN 150	KTSGA7B200-300	LLH15+1GA15+2GAB15+2GAB15+2GAB15
7 X Gas 220 - 300	2036	DN 150	KTSGA7B200-300	LLH15+1GA15+2GAB15+2GAB15+2GAB15
8 X Gas 220 - 160	1217	DN 150	KTSGA8B	LLH15+2GAB15+2GAB15+2GAB15+2GAB15 + (8 X160ADAP)
8 X Gas 220 - 200	1555	DN 150	KTSGA8B	LLH15+2GAB15+2GAB15+2GAB15+2GAB15
8 X Gas 220 - 250	1946	DN 150	KTSGA8B	LLH15+2GAB15+2GAB15+2GAB15+2GAB15
8 X Gas 220 - 300	2327	DN 150	KTSGA8B	LLH15+2GAB15+2GAB15+2GAB15+2GAB15
2 X Elbows 90deg	NA	DN 150	TSDN159EL	Optional Extra

List of Materials Supplied with DN150 Cascade Kits

LLH15

No	Description	Pcs
1	Low Loss Header	1
2	Swan Neck Flow Pipe	1
3	Swan Neck Return Pipe	1
4	Blind Flanges DN150 for Flow and Return Collectors	2
5	Blind Flange DN100 for gas collector	1
6	DN150 Gaskets	4
7	Gas DN100 Gaskets	1
8	M16 x 70 Screws	32
9	M16 Nuts	32
10	A16 Washers	32

1GA15

No	Description	Pcs
1	Flow Collector DN150 for one Boiler	1
2	Return Collector DN150 for one Boiler	1
3	Gas Collector DN100 for one Boiler	1
4	Flow Pipe Kit	1
5	Return Pipe Kit	1
6	Gas Pipe Kit	1
7	DN150 Gasket	2
8	DN100	1
9	2" Union Gaskets	2
10	1.5" Rubber Gasket	1
11	M20 X 80 Screws	24
12	M20 Nuts	24
13	A20 Washers	24
14	Collectors Support Stands	2
15	Mounting Bolt Kit	8

List of Materials Supplied with DN150 Cascade Kits

2GAL15

No	Description	Pcs
1	Flow Collector DN150 for two boiler in line	1
2	Return Collector DN150 for two boilers in line	1
3	Gas Collector DN100 for two boiler in line	1
4	Flow Pipe Kit	2
5	Return Pipe Kit	2
6	Gas Pipe Kit	2
7	DN150 Gasket	2
8	DN100 Gasket	1
9	2" Union Gasket	4
10	1.5" Union Gasket	2

11	M20 X 80 Screws	24
12	M20 Nuts	24
13	A20 Washers	24
14	Collectors Support Stands	2
15	Mounting bolt Kit	8

2GAB15

No	Description	Pcs
1	Flow Collector DN150 for two boilers back to back	1
2	Return Collector DN150 for two boilers back to back	1
3	Gas Collector DN100 for two boilers back to back	1
4	Flow Pipe Kit	2
5	Return Pipe Kit	2
6	Gas Pipe Kit	2
7	DN100 Gasket	2
8	DN65 Gasket	1
9	2" Union Gasket	4
10	1.5" Union Gasket	2

2GAB15 Cont'd

No	Description	Pcs
11	M20 X 80 Screws	24
12	M20 Nuts	24
13	A20 Washers	24
14	Collectors Support Stands	2
15	Mounting Bolt Kit	8

List of Materials Supplied with DN100 Cascade Kits

LLH10

No	Description	Pcs
1	Low Loss Header	1
2	Swan Neck Flow Pipe	1
3	Swan Neck Return Pipe	1
4	Blind Flanges DN100 for flow and Return Collectors	2
5	Blind Flange DN65 for Gas Collector	1
6	DN100 Gaskets	4
7	Gas DN65 Gasket	1
8	M16 X 70 Screws	32
9	M16 Nuts	32
10	A16 Washers	32

1GA10

No	Description	Pcs
1	Flow Collector DN100 for one Boiler	1
2	Return Collector DN100 for one Boiler	1
3	Gas Collector DN65 for one Boiler	1
4	Flow Pipe Kit	1
5	Return Pipe Kit	1
6	Gas Pipe Kit	1
7	DN100 Gasket	2
8	DN65 Gasket	1
9	2" Union Gaskets	2
10	1.5" Rubber Gasket	1
11	M16 X 70 Screws	24
12	M16 Nuts	24
13	A16 Washers	24
14	Collectors Support Stands	2
15	Mounting Bolt Kit	8

List of Materials Supplied with DN100 Cascade Kit

2GAL10

No	Description	Pcs
1	Flow collector DN100 for two Boilers in line	1
2	Return Collector DN100 for two Boilers in line	1
3	Gas Collector DN65 for two Boiler in line	1
4	Flow Pipe Kit	2
5	Return Pipe Kit	2
6	Gas Pipe Kit	2
7	DN 100 Gasket	2
8	DN65 Gasket	1
9	2" Union Gasket	4
10	1.5" Union Gasket	2
11	M16 X 70 Screws	24
12	M16 Nuts	24
13	A16 Washers	24
14	Collectors Support Stands	2
15	Mounting Bolt Kit	8

2GAB10

No	Description	Pcs
1	Flow Collector DN100 for two Boilers back to back	1
2	Return Collector DN100 for two Boilers back to back	1
3	Gas Collector DN65 for two Boilers back to back	1
4	Flow Pipe Kit	2
5	Return Pipe Kit	2
6	Gas Pipe Kit	2
7	DN100 Gasket	2
8	DN65 Gasket	1
9	2" Union Gaskets	4
10	1.5" Union Gasket	2

2GAB10 Cont'd

No	Description	Pcs
11	M16 X 70 Screws	24
12	M16 Nuts	24
13	A16 Washers	24
14	Collectors Support Stands	2
15	Mounting Bolt Kit	8

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