

# WATER HEATER UNIT WHU110/200-12\_24VDC



## OPERATING INSTRUCTIONS

Note: This manual is valid from WHU serial number 41565118.

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## SAFETY PRECAUTIONS

The hydraulic system is usually pressurized up to 250 bar.

In order to avoid damages and accidents operator and maintenance personal must act in compliance with the laws, regulations and recommendations issued by local electricity and work safety authorities.

Follow all your local safety instructions related to electric devices and the high-pressure hydraulics.

**TECHNICAL CONDITION OF YOUR MACHINERY AND EQUIPMENT MUST BE SUBJECT TO CONSTANT SURVEILLANCE.**

Hydraulic system of a carrier machine should be maintained according to the service program.

All couplings, valves and hoses should be maintained tight and clean as well as kept under constant observation.

Leaks in the hydraulic system must be fixed immediately to avoid injuries caused by high pressure and oil blowouts.

Prior to maintenance, detaching from a carrier or disassembling a DYNASET-unit, the hydraulic system of a carrier machine should be stopped and DYNASET's hydraulic circuit depressurized.

When operating or maintaining in the immediate vicinity of DYNASET hydraulic unit or accessories, appropriate protective clothing, safety goggles, gloves, ear and eye protection should be worn.

Do not touch parts heated by hydraulic oil.

**EXTERME CLEANLINESS MUST BE MAINTAINED WHEN CARRYING OUT ANY SERVICE DISSASSEMBLING OR REPAIR OF UNIT AND HYDRAULIC SYSTEM. THIS IS CRUCIAL TO ENSURE SAFE, RELIABLE AND LONG-LIFE OPERATION OF YOUR EQUIPMENT.**

Prevent freezing nozzles, water circuit and pipeline. Draining and air flushing have to perform before ambient temperature reaches 0°C (32°F).

Fuel and its vapors are extremely flammable and explosive. Fire or explosion can cause severe burns or death. Engines give off carbon monoxide, an odorless, colorless, poison gas. Breathing carbon monoxide can cause nausea, fainting or death.

Unintentional sparking can result in fire or electric shock. Unintentional start-up can result in entanglement, traumatic amputation, or laceration. See appendix engine manual.

All installation and service of both hydraulic and electric equipment must be performing experienced personnel only.

## WARNING STICKER

Dynaset dispatch department includes one (1) warning sticker bag per one (1) main product.  
Product recipient is obligated to fix determinate warning sticker to Dynaset product.  
Fix sticker to visible and appropriate place or close to Dynaset product where it's easily seen.  
Before fixing sticker clean surface with solvent detergent.



READ OPERATION INSTRUCTIONS. RISK OF ELECTRIC SHOCK. BEWARE OF HOT SURFACE.

## GENERAL INFORMATION

WHU water heater, producing hot water or steam, is ideal in demanding cleaning tasks.

High water temperature greatly enhances impact effect and water jet scouring capacity. The unit is to be connected to pressure line of Dynaset HPW high pressure pump.

Unit is especially intended for mobile use. It has next connections; Water tank, hot water out and electric power from vehicles voltage source (12/24VDC).

Control enclosure switches are front mounted and easily operated electrically ignited units functions.

WHU heating capacity is 110 kW. Electric supply 12 or 24 VDC depending on WHU type, equipped with logic control. Fuel consumption 13,5 l/h diesel.

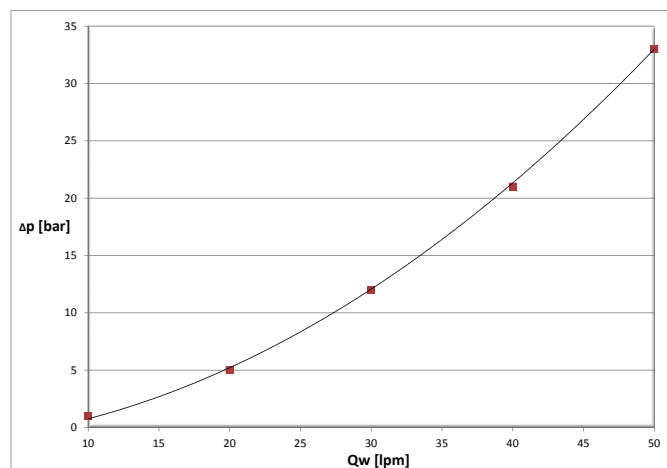


## TECHNICAL SPECIFICATION

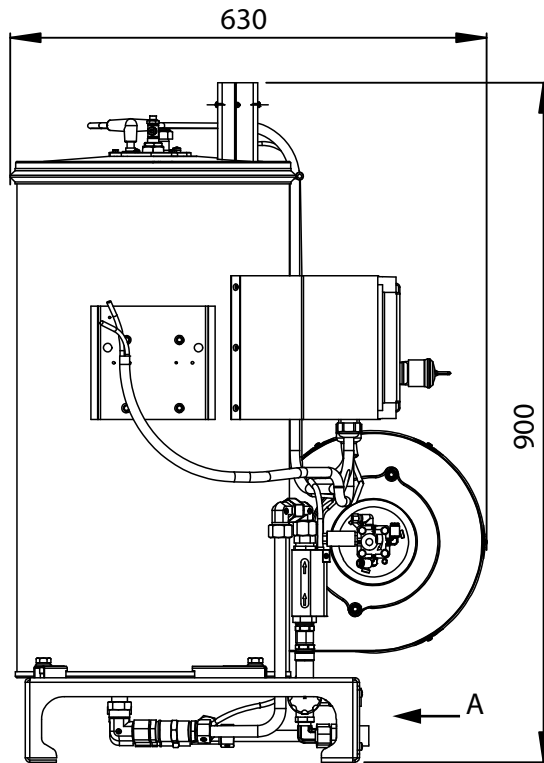
Power C	P max	Q water		Diesel fuel consumption	Supply voltage	Weight
		15 lpm	30 lpm			
110 kW	200 bar	$\Delta t$ out 96 °C	$\Delta t$ out 48 °C	13,5 l/h diesel	12 / 24 VDC	88 kg

### Pressure drop:

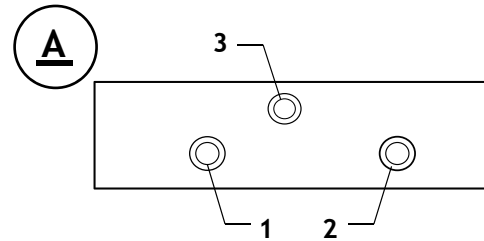
Qw / lpm	10	20	30	40
$\Delta p$ / bar	1	5	12	21



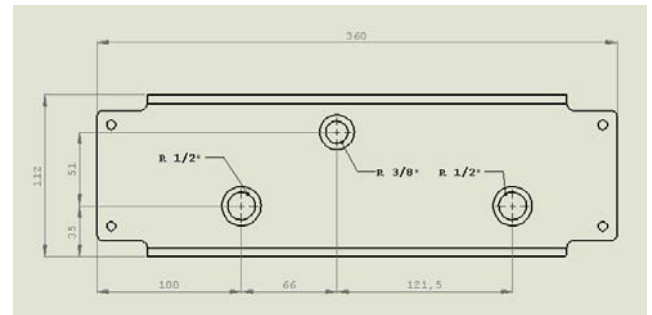
## OUTLINE DIMENSIONS AND CONNECTIONS



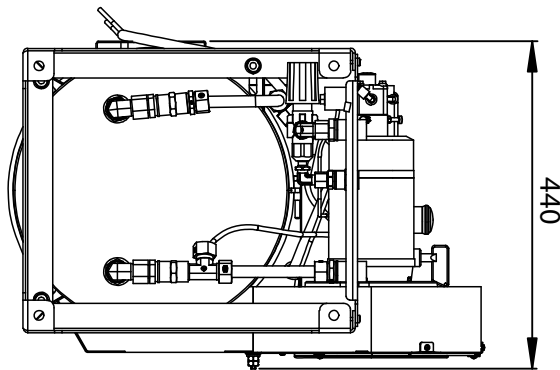
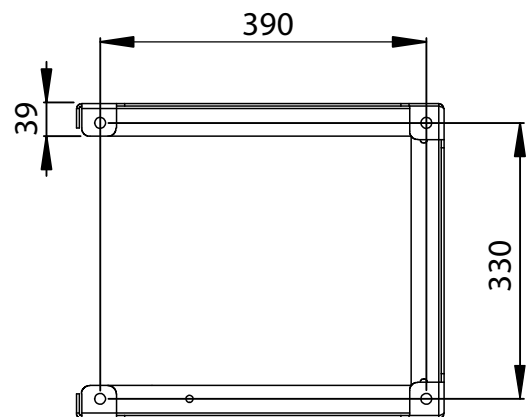
WATER PORTS		
Water in 1.	Water out 2.	Over flow 3.
R 1/2"	R 1/2"	R 3/8"



WATER PORTS INSTALLATION DIMENSIONS:



FOOT (3.1) INSTALLATION DIMENSIONS:



## WHU BURNING PROCESS

Controls water heater burn process according to the measured exhaust gas and water output temperatures and water flow sensor.

If at any time water flow is stopped the burner will stop after a delay of 4 seconds if the water flow is not restored within that time.






Burner will stop immediately and the failure indicator light will start indicating if one or several of the following conditions is met:

- A. Water temperature >110C (Alarm 3),
- B. Exhaust gas temperature > 300C (Alarm 4),
- C. Exhaust gas temperature drops more than 15°C after burning sequence has started (Alarm 2), if ignition sequence has failed (Alarm 1), or if emergency stop button has been pressed indicator light burns continuously. See TABLE 1.

After failure is resolved, Press the Reset button for 2 seconds to reset the fault.

Fan motor has a 15 seconds cooling sequence after burner has stopped.

**ALARM SEQUENCE TABLE 1.**

	Alarm 1 0.5s/0.5s
	Alarm 2 1s/1s
	Alarm 3 2s/1s
	Alarm 4 3s/1s
	Emergency Stop Continues

## WHU BURNING PROCESS

### STARTUP SEQUENCE

1. Fan motor starts.
2. Five (5) second delay.
3. Ignition spark and fuel switched on.
4. Wait for exhaust gas temperature to rise for min 15°C in 10 seconds. If the temperature is reached sequence will continue, otherwise sequence will restart from the beginning for maximum of 4 times. If the temperature level is not reached, the sequence will abort and fault indicator light will light up. After failure is resolved, the sequence can be reset by pressing reset button for 2 seconds/until failure indicator light will go off.
5. Wait for exhaust gas temperature to rise 10°C for maximum of 15 seconds. If the temperature is reached, sequence will continue, otherwise re-ignition will take place maximum of 5 times. If the temperature level is not reached, the sequence will abort and fault indicator light will light up.
6. After failure is resolved, the sequence can be reset by pressing reset button for 2 seconds/until failure indicator light will go off.

### SWITCH OFF SEQUENCE

Heater cuts the fuel flow if determinate temperature has reached and performs exhaust gas ventilation (10 sec).

Water runs normally through heater unit without warming. Blower starts automatically before ignition transformer and solenoid ignited the heating process. WHU heating stays on until water flow is stopped or unit is turned off.

Any time water flow is stopped the heater will stop after set delay provided the water flow be not restarted within delay. After water flow is continued, WHU automatically starts ignition sequence.

Heater has equipped with the safety function, which stop heater immediately.

The failure indicator light will light up if one or several of the following conditions are met:

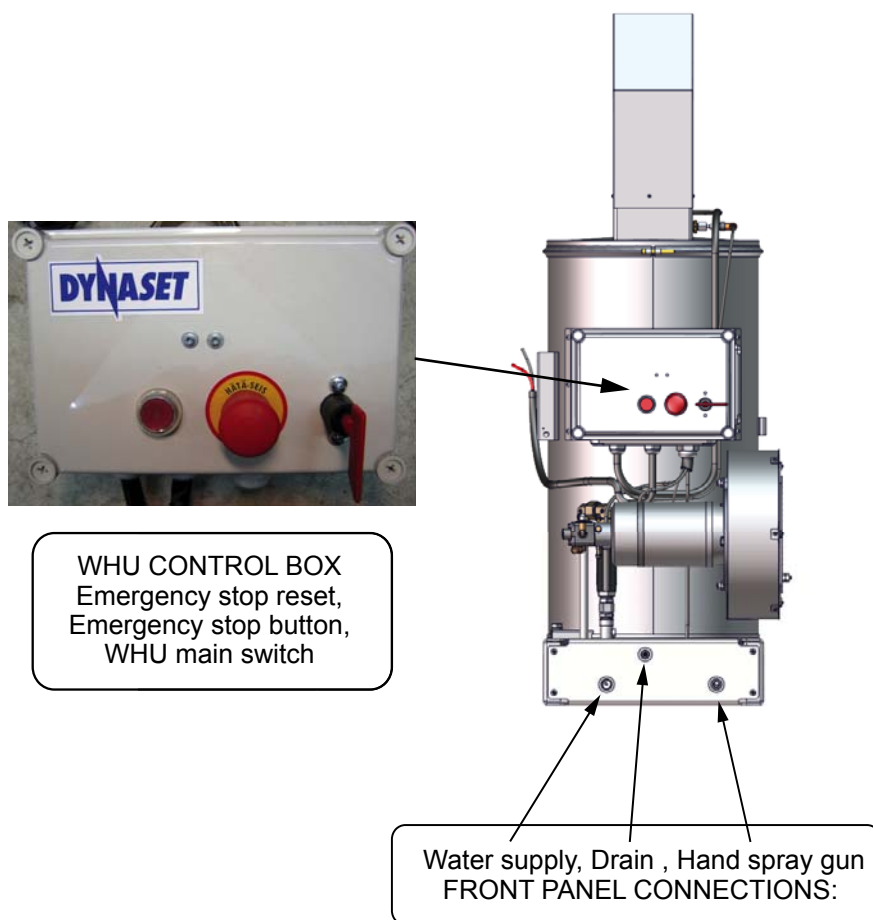
1. Water temperature >110°C.
2. Exhaust gas temperature Stays up and flame is on.
3. Exhaust gas temperature <300°C.

Fan motor has a 15 sec cooling sequence after burner has stopped.

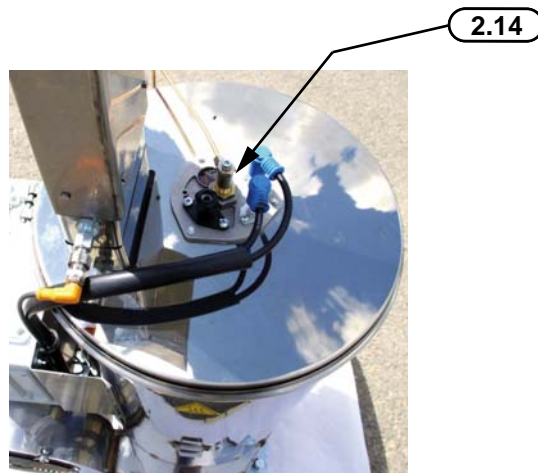
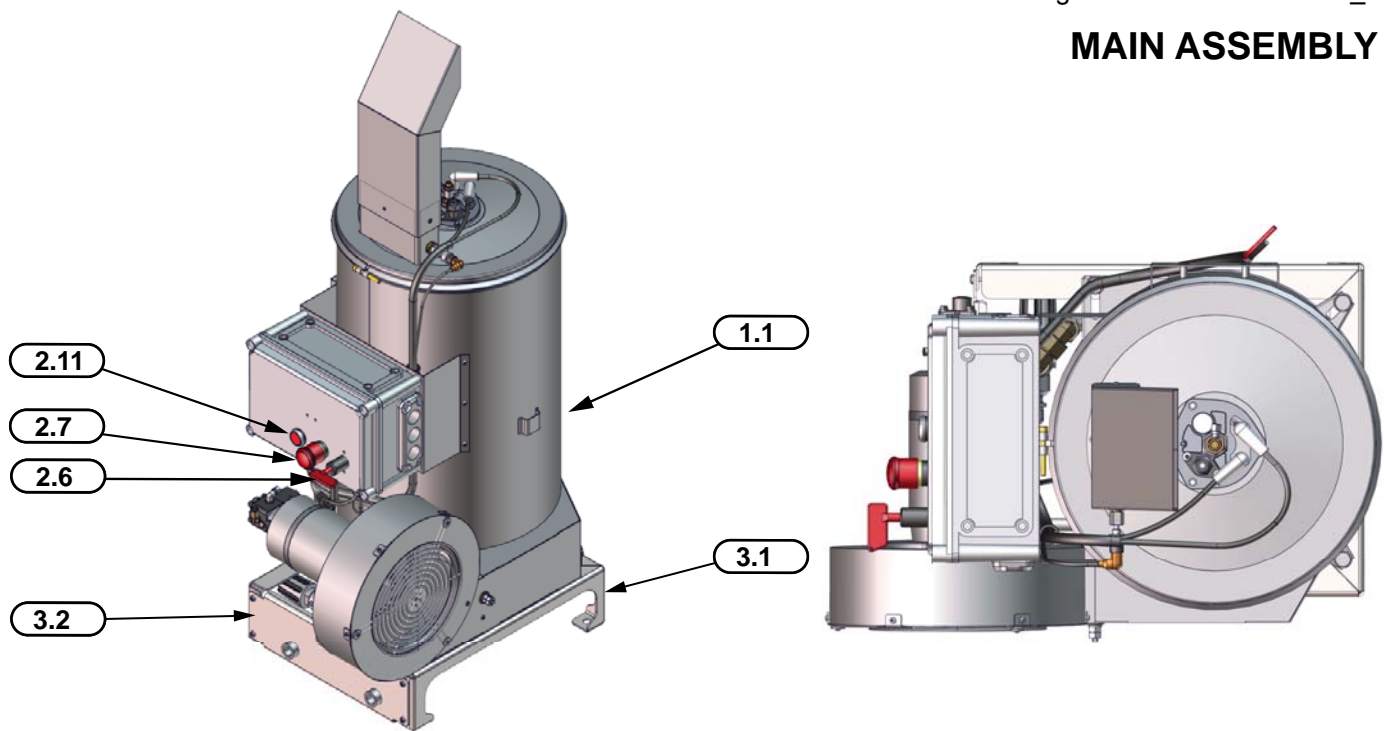
## INSTALLATION AND OPERATION

Install WHU unit firmly onto its chassis. Ensure electric supply 12VDC or 24VDC is connected to WHU control box. Fuel is enough in the WHU fuel tank.

1. Attach water supply to the water supply connection (front panel).
2. Attach hand spray gun to the hand spray gun (outlet) connection.
3. Switch water faucet (ball valve) on at water supply network or PTO (power take off) driven Dynaset HPW pump pumping water to the WHU unit.  
If the water system has mixing valve between WHU supply and outlet lines, it is possible to adjust water temperature accordingly.
4. Switch WHU main switch on.
5. Point the hand spray gun to the target and press the handle.
6. Release hand spray gun handle -> water flow stops and the heater burner will stop after a delay of four (4) seconds if the water flow is not restored (handle pressed) within that time.  
Finally heater performs exhaust gas ventilation (10 seconds).
7. Turn WHU main switch off.
8. Switch water supply to WHU off, faucet (ball valve) or PTO.



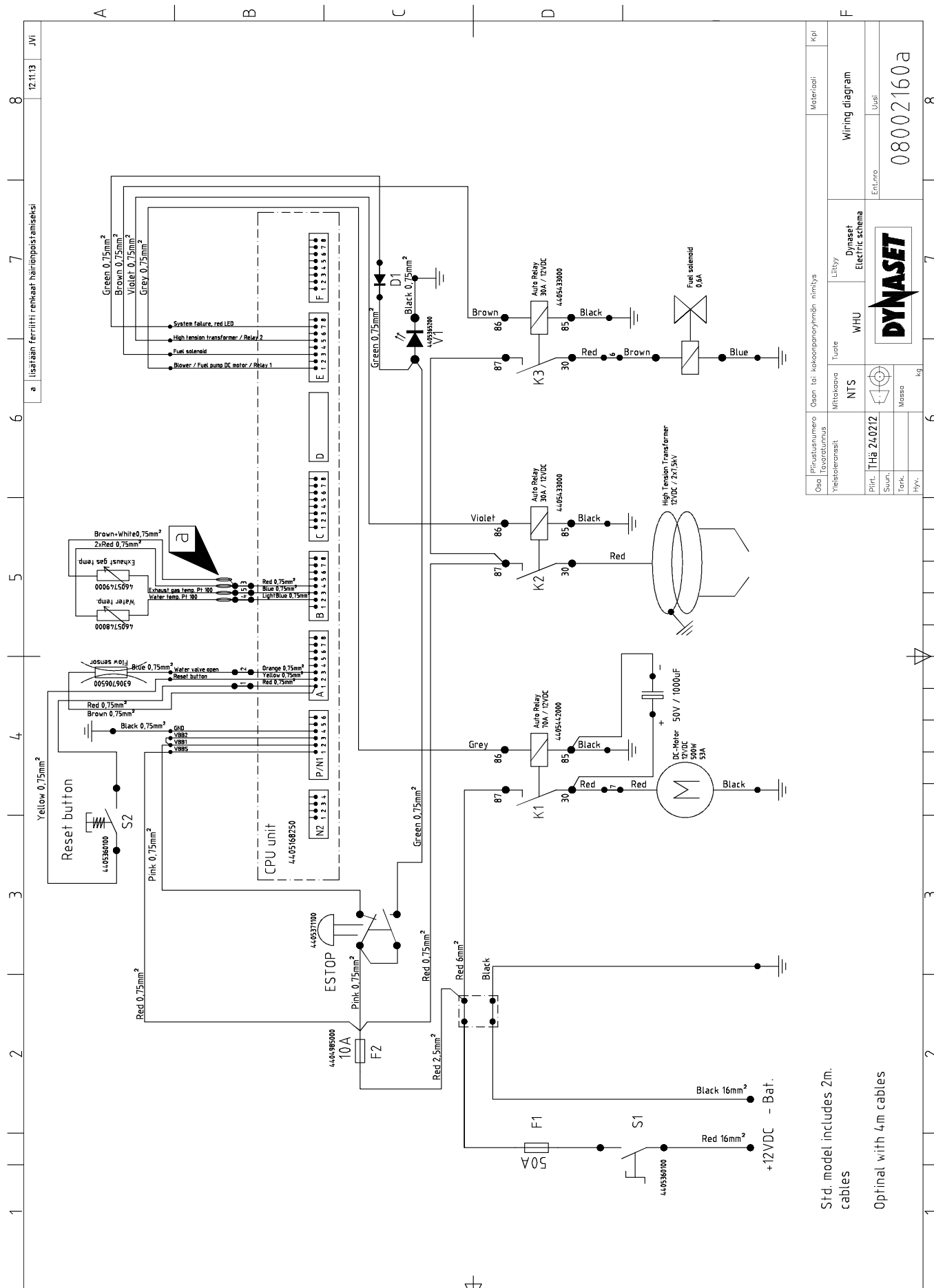


**MAIN ASSEMBLY**

**PART LIST**

No	CODE	DESIGNATION	DETAILS	QUANTITY
1	D210107010	WHU110/200-12V COMPLETE		1
1	D210107011	WHU110/200-24V COMPLETE		1
1.1	6306695000	WHU200 BURNER 110kW 12VDC		1
1.1	6306695100	WHU200 BURNER 110kW 24VDC		1
2.0	D100105181	ELECTRIC CABINET	WHU110 12VDC	1
2.0	D100105182	ELECTRIC CABINET	WHU110 24VDC	1
2.1	4405262000	ENCLOSURE		1
2.2	4405168250	CAN I/O-MODULE	12I/8O	1
2.3	4405168230	CAN I/O-MODULE	12I/12O	1
2.4	4405433000	RELAY	12Vdc	2
2.5	4405442000	RELAY	12Vdc 70A	1
2.6	4405361700	MAIN SWITCH		1
2.7	4405371100	E-MERGENCY STOP BUTTON		1
2.8		ADAPTER		2
2.9		CONTACT ELEMENT NO		2
2.10		CONTACT ELEMENT NC		1
2.11		LIGHT BUTTON		1
2.12		LED ELEMENT		1
2.13		DIODE		1
2.14	4605748000	SENSOR	PT-100	1
2.15	4605749010	SENSOR, ROD	PT-100	1
2.16		RECEPTACLE MALE	M12	1
2.17	6306696200	IGNITION WIRES	WHU200	1
2.18		ENCLOSURE		1
2.19		RELAY SOCKET	12V/24V, 30A	1
2.20		SPLASH GUARD		1
2.21		FUSE BOX		1
2.22		TERMINAL BOARD		1
2.23		FUSE	10A	1
2.24		TERMINAL BLOCK	L 2,5mm2	14
2.25		TERMINAL BLOCK	L 6mm2	1
2.26		TERMINAL BLOCK	PE 2,5mm2	1
2.27		TERMINAL BLOCK		1
2.28		MOUNTING RAIL	EN 35x7,5mm	1
2.29		ALLEN SCREW	M6x25 8.8	2
2.30		NUT	M6	2
2.31		LOCKING WASHER	A6,4x11	4
2.32		ALLEN SCREW	M4X35 8.8	2
2.33		SCREW COUNTERSINK	M4X16 8.8	4
2.34		ALLEN SCREW	M5X30 8.8	4
2.35		LOCKING WASHER	A5,3x10	4
2.36		NUT	M5	4
3.1	0709015902	FOOT	WHU110/250	1
3.2	0709015904	FRONT PLATE		1
3.3	0709015906	FASTENING PLATE CABINET		1
3.4		FITTING	R1/2u-R3/8s	2
3.5	6306376000	OVER FLOW VALVE	30lpm 200bar	1
3.6		SVIWEL ELBOW FITTING	R1/4	1
3.7		LINK FITTING	R3/8u-R1/4s	1
3.8		JOINT FITTING	R3/8	1
3.9		LINK FITTING	R3/8u-R3/8s	1
3.10		SEAL USIT	R3/8	3
3.11	6306703000	FLOW SWITCH	250bar R3/8	1
3.12		FITTING	15L R1/2	2
3.13		FITTING	15L R3/8	1
3.14		SEAL USIT	R1/2	3
3.15		ELBOW FITTING	R1/2-R1/2 u/s	2
3.16		SVIWE T- FITTING	L15	1
3.17		SLEEVE	R1/2	1
3.18		PLUG	L15	1
3.19		FELLURE	L15	4
3.20		NUT	15L M22x1,5	5
3.21		LINK FITTING	L15	2
3.22		LINK FITTING	R1/2s	1
3.23		ALLEN SCREW	M10x40 8.8	3
3.24		WASHER	A10,2x18	6
3.25		SPRING WASHER	10,2x18	6
3.26		NUT	M10	3
3.27		ALLEN SCREW	M6x16 8.8	6
3.28		ALLEN SCREW	M5x12 8.8	6

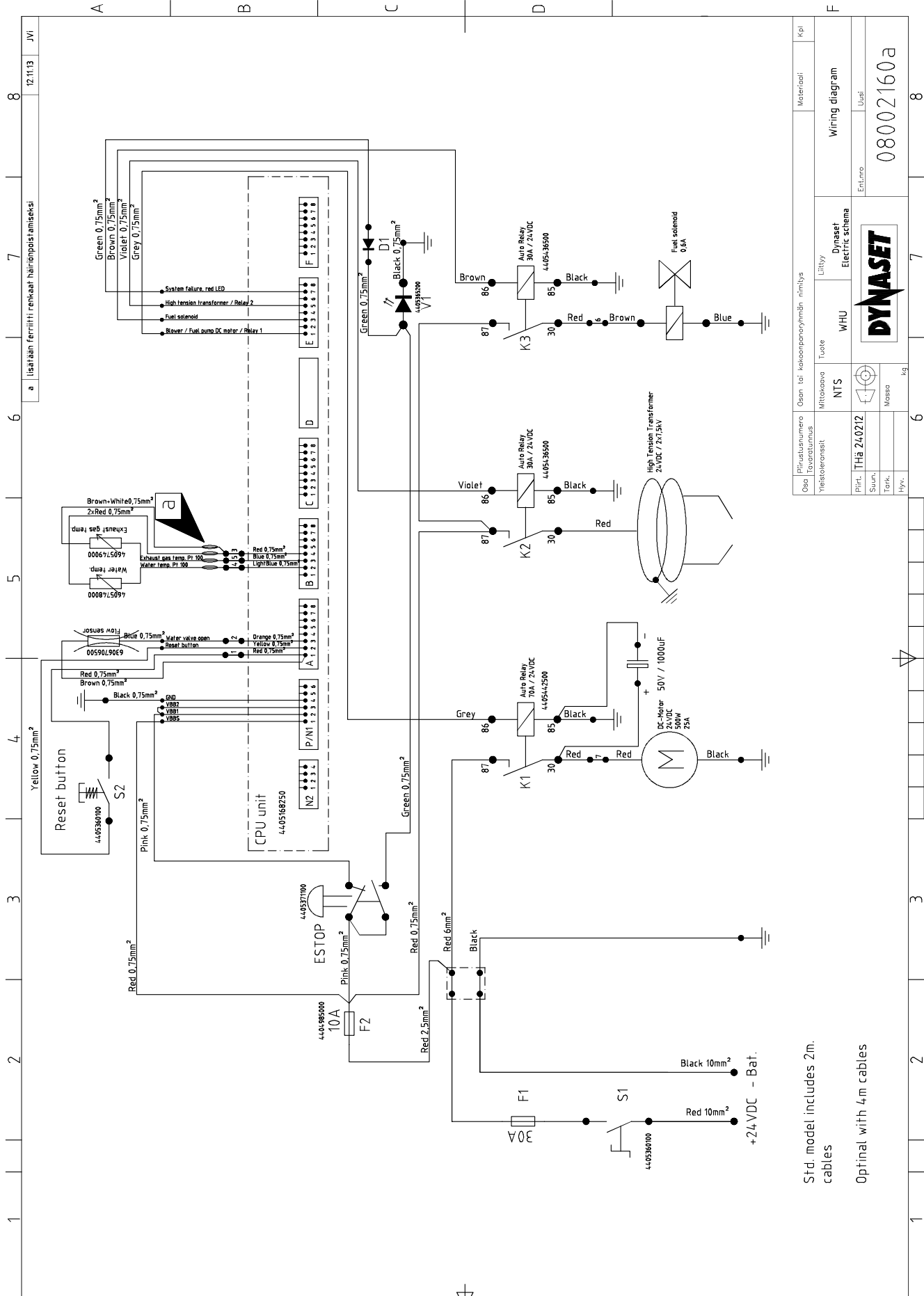
## WHU110-200-12V WIRING DIAGRAM



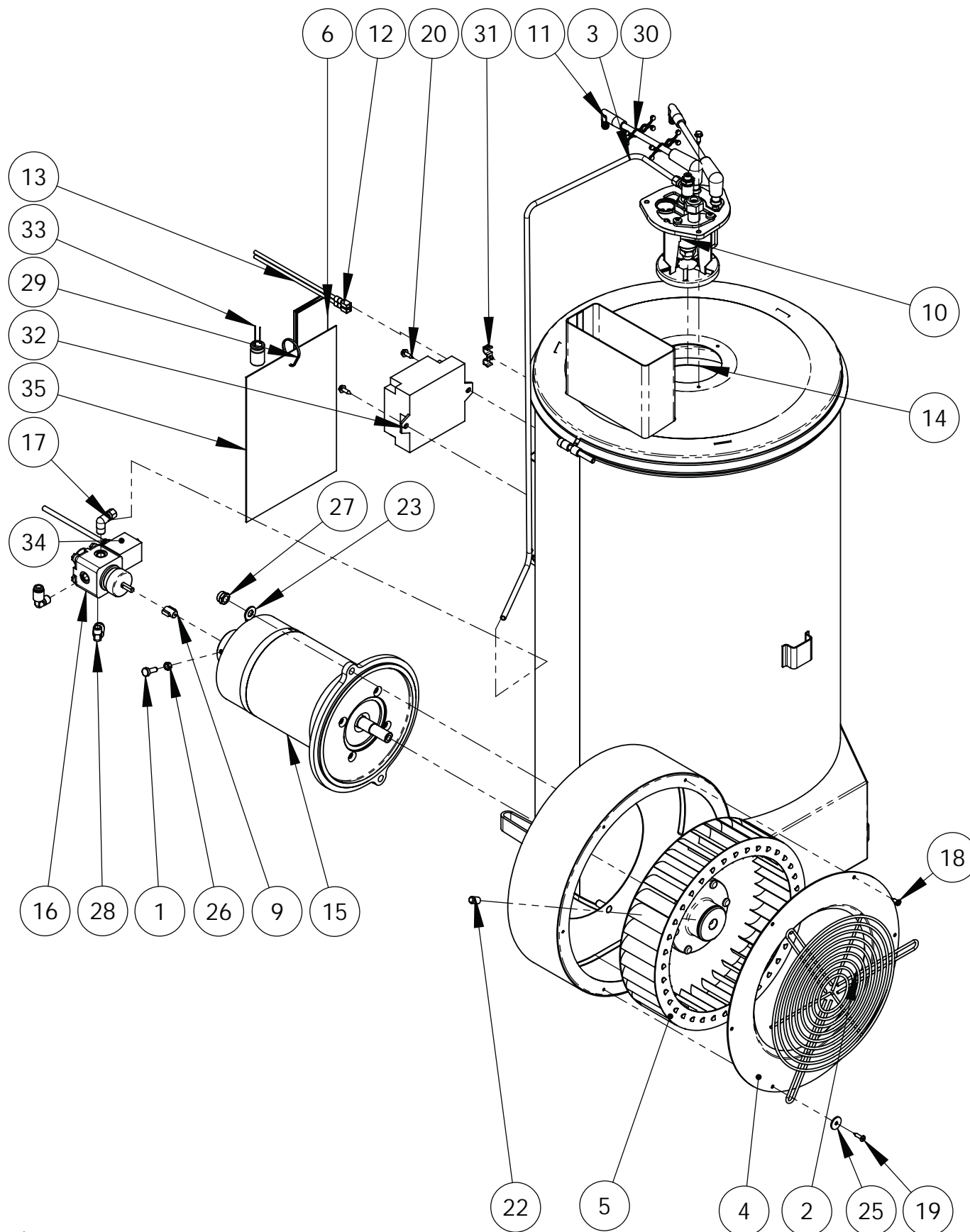
Std. model includes 2m.  
cables

### Optimal with 4m cables

## WHU110-200-24V WIRING DIAGRAM



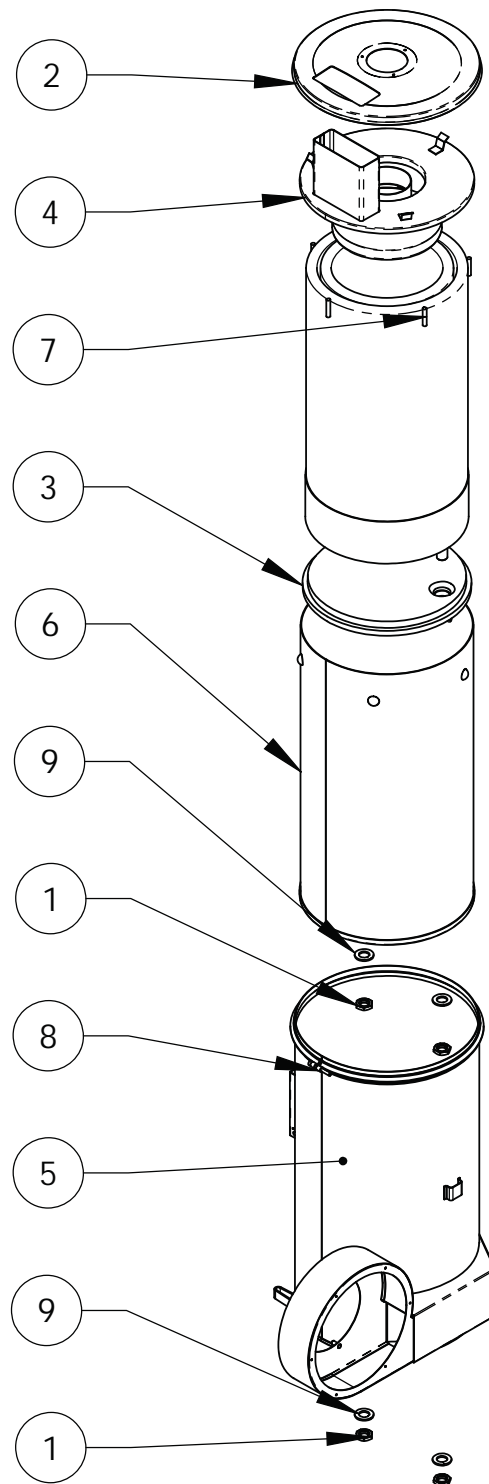
## WATER HEATING UNIT WHU 110/200 -12V\_24V BURNER ASSEMBLY



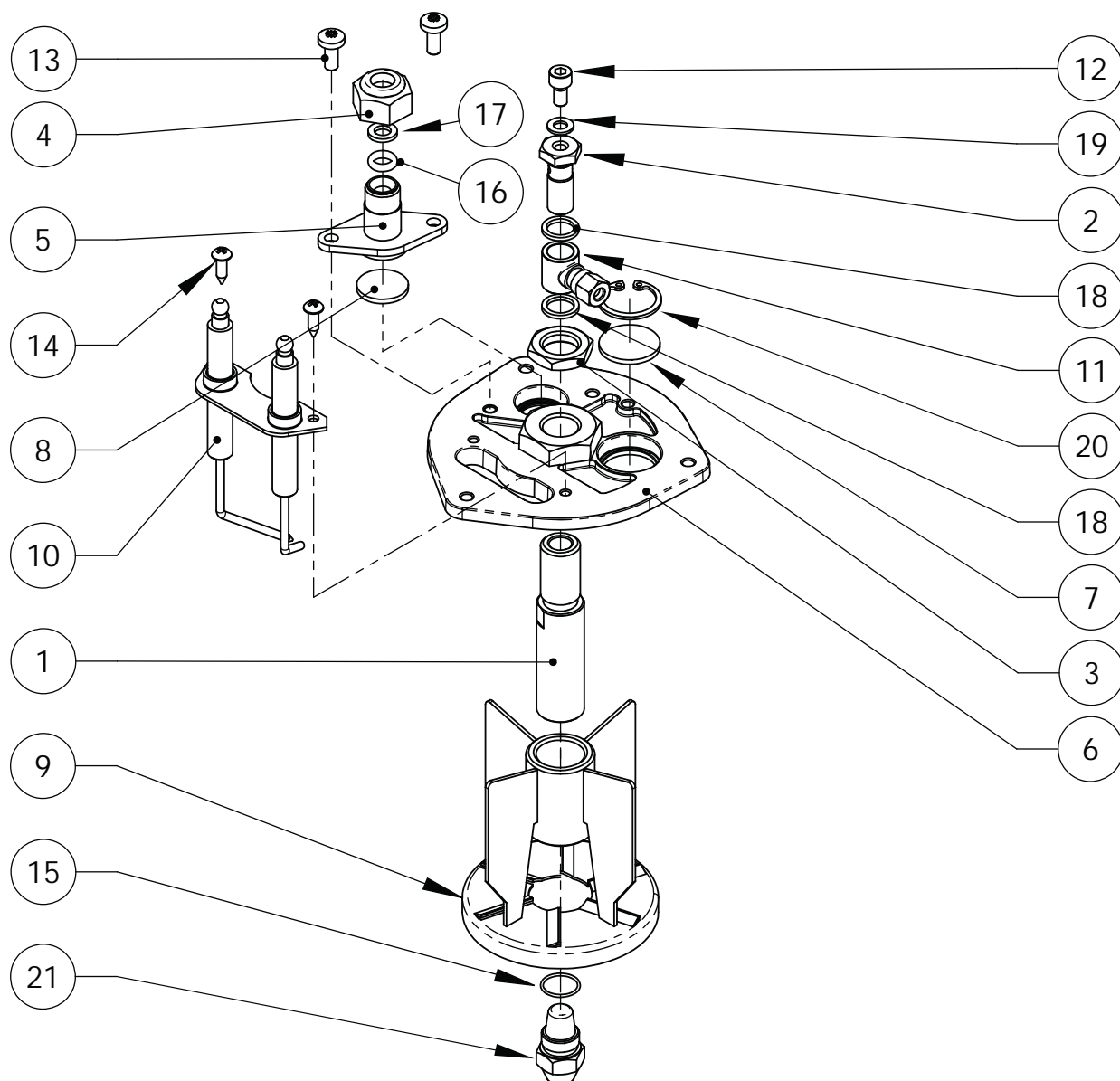
11/2014

**WHU 110/200 -12V\_24V BURNER ASSEMBLY**

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
1		SCREW	10 M5X20	3
2		GRATE, CONVEYOR AIR CHECK		1
3		BRANCH TUBE W6000		1
4		PIPE UNION		1
5		INPELLER		1
6		BOILERS CONNECTION	12/24V	1
9		COUPLING	DX	1
10		ELECTRODES COVER	2.50 60°B	1
11		CABLE	L=600	2
12		POWER CABLE	2.5MM QX1500	1
13		POWER CABLE	2.5MM QX1500	1
14		BOILER		1
15		ELECTRIC MOTOR	12V	1
16		PUMP		1
17		CONNECTION		1
18		SELF-TAPPING SCREW	3.5X10 AB	3
19		SELF-TAPPING SCREW	3.5X14 AB	3
20		SELF-TAPPING SCREW	3.9X13 AB	5
21		SELF-TAPPING SCREW TSP	5X70 TA H	2
22		GRUB SCREW		1
23		WASHER	M8 UNI6592	2
25		WASHER	M4 UNI6593	3
26		NUT	M5 UNI5588	3
27		NUT	M8 UNI7474	2
28		L CONNECTION	G1/4	2
30		CLAMP	2Ø5.1/Ø7.6	2
31		CLAMP	2XØ6.4	1
32		TRANSFORMER	12V	1
33		CAPASITOR	1000µF 50V	1
34		COIL	12V DC	1

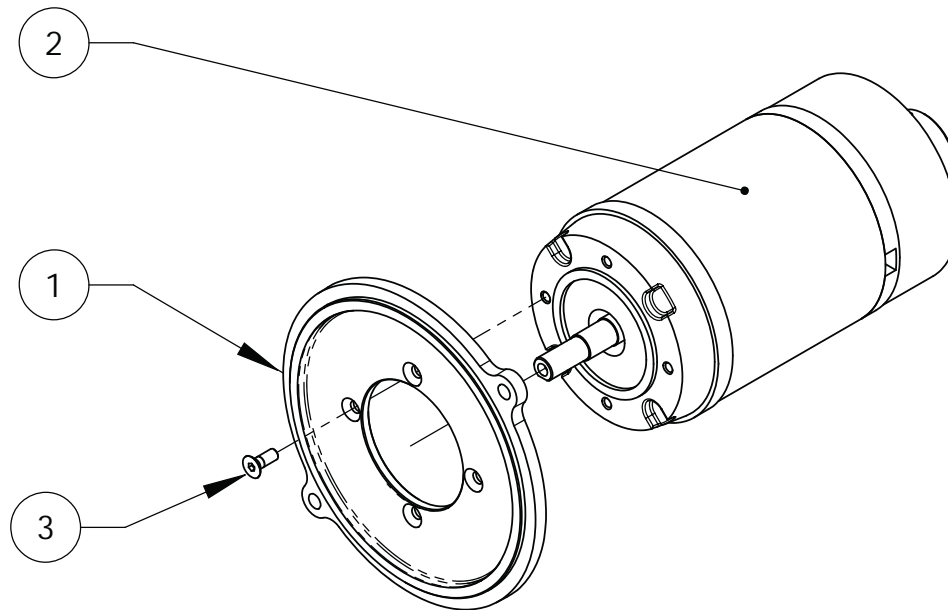
**WHU 110/200 -12V\_24V  
BOILER ASSEMBLY**

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
1		FERRULE		4
2		COVER		1
3		INSULATOR		1
4		COVER		1
5		JACKET		1
6		INTERNAL JACKET	30L	1
7		COIL	30L	1
8		CLAMP		1
9		WASHER	M20 UNI6592	4
10		INSERT	UNI 9202-A M61	4

**WHU 110/200 -12V\_24V ELECTRODE COVER ASSEMBLY**

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
1		CONNECTION	9/19 - G1/8	1
2		CAP FORATOG1/8+CONTR.PRESS.	M5	1
3		FERRULE		1
4		FERRULE	G1/4"	1
5		FLANGE		1
6		FLANGE		1
7		GLASS		1
8		GLASS	Ø19	1
9		DEFLECTOR WORK		1
10		ELECTRODES		1
11		CONNECTION		1
12		SCREW	M5X10 UNI5931	1
13		SCREW	M5X12 UNI7687	2
14		SELF-TAPPING SCREW	3.9X13	2
15		O-RING	0130-1	1
16		O-RING	3024	1
17		WASHER		1
18		COPPER WASHER	G1/8	2
19		COPPER WASHER	M5	1
20		SNAP RING		1
21		NOZZLE	2.5 60°B	1



**WHU 110/200 -12V\_24V ELECTRIC MOTOR ASSEMBLY**

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
1		FLANGE		1
2		ELECTRIC MOTOR	12V DC 500W 2800 rpm	1
3		SCREW	M6X16 UNI5933	1

## PRODUCT DISPOSAL

Conform to waste legislation, regulations and recommendations in waste disposal and waste recycling issued by local authorities.

### 1. Precondition:

- Product is permanently useless or beyond repair.
- Before transportation get off all used agent (oil, cooling liquid) and dirty filters.

Items requiring special handling can normally be done by authorized waste management facility, if not:

- Separating the base materials, iron, copper, steel, electronics, removing paint, polyester resin, and insulation tape and/or plastics residues from all components.
- This 'waste material' can now be recycled.

### 2. Deliver the recycling and waste material to waste management facility.

Note! Customer can send the DYNASET equipment for reuse or recycling to the Dynaset Oy or to other location determinate by Dynaset representative.

- Customer pays shipping cost.
- Equipment must be adequately packed for shipment.
- Shipment documents must contain purchaser's name, contact information, equipment type and serial number.



**MANUFACTURER'S LIMITED WARRANTY****1. Warranty coverage**

All hydraulic accessories manufactured by DYNASET OY are subject to the terms and conditions of this limited warranty. Products are warranted to the original purchaser to be free from defects in materials or workmanship. Exclusions from warranty are explained in item 8.

**2. Beginning of warranty period**

Warranty period begins from the delivery date of the product. Delivery is considered to be done on the date when installation has been accomplished or purchaser has taken the product in use. Product is considered as taken in use at the date when DYNASET OY has delivered the product to purchaser, unless separately agreed otherwise by written agreement.

**3. Warranty period**

Warranty period is twenty four (24) months based on maximum of 2000 hours usage during this time period. In cases where the system is provided complete with certain special components (e.g. drive unit), those components are considered as a subject to their manufacturer's warranty.

**4. Warranty procedures**

Immediately upon identifying a problem which purchaser believes to be a failure subject to the product's limited warranty, purchaser must contact primary to the seller of the product. Contact must be made as soon as possible, latest thirty (30) days after the problem was identified. Seller and/or manufacturer technical staff determines the nature of the problem primarily by phone or e-mail. Purchaser commits to give necessary information and to perform routine diagnostic procedures in order to determine the nature of the problem and necessary procedures.

**5. Warranty repairs**

If the product is found to be defective during the warranty period, DYNASET OY will, at its option, either repair the product, author it to be repaired at its authorized workshop or exchange the defective product. If the product must be repaired elsewhere than premises of DYNASET OY or authorized workshop, all costs excluded from this warranty (traveling and waiting hours, daily allowance, traveling expenses and uninstallation/reinstallation costs) will be charged from the purchaser.

If the problem is not covered by this limited warranty, DYNASET OY has the right to charge purchaser of troubleshooting and repairing.

**6. Delivery terms of warranty repair**

If the product is found possible to be defective under this limited warranty and it needs to be repaired, DYNASET OY gives Warranty Return Number (WRN). Items being returned must be shipped, at the purchaser's cost, adequately packed for shipment, to the DYNASET OY or to other location authored by DYNASET OY.

Shipment documents must contain:

- Purchaser's name and contact information
- Receipt of original purchase
- WRN code
- Problem description

**7. Warranty of repaired product**

Warranty period of the product repaired under this limited warranty continues to the end of original warranty period.

**8. Exclusions from warranty**

This warranty shall not apply to:

- a. Failures due to normal wear and tear, improper installation, misuse, abuse, negligence, purchaser selection of improper product to intended use, accident, improper filtration of hydraulic oil or intake water or lack of maintenance
- b. Cost of maintenance, adjustments, installation or startup
- c. Coating, hydraulic oil, quick couplings and interconnection hoses (internal or external to system assemblies)
- d. Products altered or modified in a manner not authorized by DYNASET OY in writing
- e. Products which have been repaired during warranty period by others than DYNASET OY or its authorized workshop
- f. Costs of any other damage or loss, whether direct, indirect, incidental, special or consequential, arising out of the use of, or the inability to use, the product
- g. Telephone or other communications expense
- h. Product that is used in exceptional conditions, considered to cause excessive wear and tear
- i. Faults caused by nature phenomenon's like flood, thunder, etc.

## EC DECLARATION OF CONFORMITY

We hereby declare that the below-reference product design and manufacturing are in conformity with the provisions in the Council Directive on mutual approximation of laws of the Member States on the safety of machines.

- Machine directive 2006/42/EC
- LVD directive 2006/95/EC
- EMC directive 2004/108/EC.
- SFS 135-1 Machines and machinery. Electrical equipment and systems.

Apply conformity standards:

- EN ISO 4413: EN ISO 4413:2010 Hydraulic fluid power - General rules and safety requirements for systems and their components.
- Safety of Machinery. Electrical equipment of machines. SFS 60204 SFS-EN-60204-1-6. Protection against electric shock. SFS-EN-60204-1-8. Equipotential bonding.  
Electrical assemblies are fitted with these standards to meet the requirements.

If device has changed by someone other than at the hands of manufacturer or his permission, this declaration is not valid.

**PRODUCT:** DYNASET WATER HEATER UNIT

**TYPE NUMBER:** WHU110-200-12VDC  
WHU110-200-24VDC

YLÖJÄRVI 04.09.2013

**DYNASET Oy**



Timo Nieminen  
R&D Manager