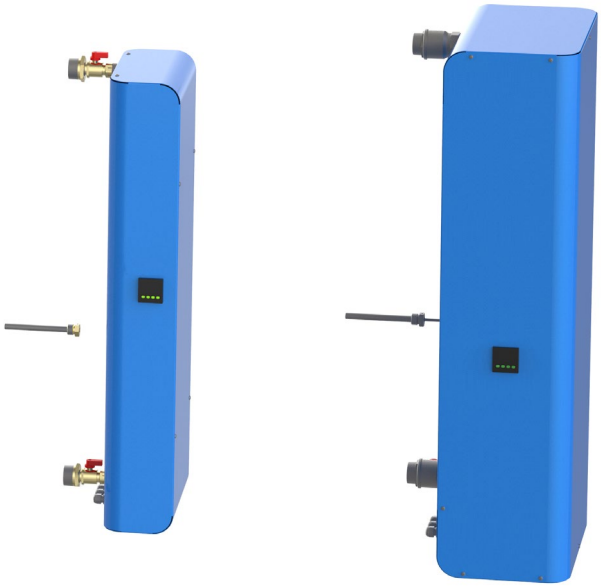
MANUALE D'USO E MANUTENZIONE
USE AND MAINTENANCE MANUAL



PREPARATORE RAPIDO PER LA PRODUZIONE DI ACS
FAST HEATER FOR INSTANTANEOUS DHW PRODUCTION

Istruzioni originali in lingua italiana - English translation of the original instructions in Italian

Lingua/ Language
IT-EN

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1. Simbologia

All'interno di questa pubblicazione possono essere utilizzati i seguenti simboli:



PERICOLO: Richiama l'attenzione su azioni che, se non correttamente eseguite, possono provocare gravi lesioni.



DIVIETO: Richiama l'attenzione su azioni che impongono un divieto.



PERICOLO TENSIONE: Richiama l'attenzione su azioni che, se non correttamente eseguite, possono provocare gravi lesioni o la morte alle persone esposte.



PERICOLO ALTE TEMPERATURE: Richiama l'attenzione su azioni che, se non correttamente eseguite, possono provocare gravi lesioni alle persone a causa dell'alta temperatura dei componenti.



IMPORTANTE: Richiama l'attenzione su informazioni tecniche o consigli pratici che rendono possibile un utilizzo più efficace ed economico dell'apparecchiatura.



OBBLIGO: Richiama l'attenzione su azioni che impongono un obbligo al fine di ottenere il corretto funzionamento della macchina.

2. Osservazioni

Conservare il manuale in luogo asciutto, per evitarne il deterioramento, per almeno 10 anni, per eventuali riferimenti futuri.
Leggere attentamente e completamente tutte le informazioni contenute in questo manuale.
Prestare particolarmente attenzione alle norme d'uso accompagnate dal simbolo "**PERICOLO**" o "**DIVIETO**" in quanto, se non osservate, possono causare danno alla macchina e/o a persone e cose.
Per anomalie non contemplate in questo manuale, interpellare tempestivamente il Servizio Assistenza.
Il costruttore declina ogni responsabilità per qualsiasi danno dovuto ad un uso improprio della macchina, ad una lettura parziale o superficiale delle informazioni contenute in questo manuale.
L'apparecchio deve essere installato in maniera tale da rendere possibili operazioni di manutenzione e/o riparazione.
La garanzia dell'apparecchio non copre in ogni caso i costi dovuti ad autoscale, ponteggi o altri sistemi di elevazione che si rendessero necessari per effettuare gli interventi in garanzia.
Le informazioni contenute nel presente documento possono essere modificate senza preavviso e non comportano l'assunzione, nemmeno implicita, di alcun obbligo da parte del costruttore.
È fatto divieto di riprodurre e/o rendere nota, a terzi e a società concorrenti, tale documentazione.

Questo manuale d'uso è parte integrante del prodotto e lo dovrà accompagnare sempre. In caso di smarrimento o illeggibilità della targhetta o di questo manuale d'uso richiedere un duplicato al costruttore.

3. Descrizione del prodotto

Il prodotto è costituito da un gruppo di scambio termico a piastre ad alta efficienza completo di raccorderia, pompa di circolazione, box isolato, controllore elettronico e sonda di temperatura.
Il produttore rapido di acqua calda sanitaria si può abbinare a qualsiasi capacità della gamma di serbatoi e bollitori per ACS.
La possibilità di abbinare i kit ad accumuli di varie tipologia e volume, consente di realizzare un'ampia gamma di soluzioni per la produzione rapida di acqua calda sanitaria ideali per piccole e medie installazioni (abitazioni, ristoranti, alberghi, centri sportivi,ecc).
Rispetto ai sistemi tradizionali con bollitore a serpentino fisso, i vantaggi dell'abbinamento all'accumulo di uno scambiatore a piastre esterno sono:

- utilizzare un accumulo di capacità inferiore a parità di ACS erogata, quindi ridurre drasticamente gli ingombri;
- ottimizzare l'abbinamento tra potenza della caldaia (o del generatore di calore) e le prestazioni dello scambiatore;
- diminuire il tempo di reintegro di ACS.

3.1 Modello e tipo

Preparatore rapido per ACS

Taglia preparatore rapido (kW) ……

Capacità serbatoio (litri) ……

Riportare la taglia del kit e la capacità del serbatoio controllando i dati nella targhetta di identificazione.

3.2 Costruttore

Fiorini Industries S.r.l.

Sede legale ed amm.va: Via Zampeschi, 119 - 47122 FORLI' (FC) - ITALY
P.I. e C.F.: 03948070408
Capitale Sociale: € 500.000,00 i.v.
Iscritta reg. delle imprese della provincia di Forlì-Cesena al n°03948070408

3.3 Marcatura CE

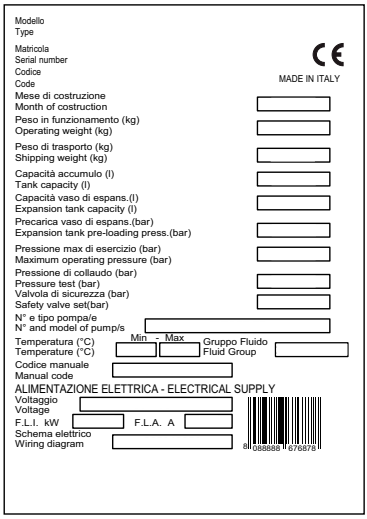
Il prodotto, conforme alle specifiche direttive dell'Unione Europea, reca la marcatura **CE** apposta sulla targhetta di identificazione.

4. Conformità alle Direttive Europee

Direttiva	Titolo
2006/42/CE	Direttiva macchine.
2014/30/EU	Direttiva Compatibilità Elettromagnetica.
2014/35/EU	Direttiva Bassa Tensione.
2014/68/EU	PED, Direttiva in materia di attrezzature a pressione.

5. Identificazione

Il prodotto è identificato dalla targhetta, sotto riportata, applicata su di esso.



6. Caratteristiche gruppi abbinati all'accumulo

Modello	Potenza con primario 55-50°C	Capacità Accumulo	TA 50°C; Tout ACS 45°C: Tin ACS 10°C		
	(kW)	(l)	l/10 min	l/60 min	Tempo ripristino ACS
12/35	12	200	278	523	46
		300	392	640	70
		500	621	870	116
18/70	18	500	645	1015	77
		750	931	1300	116
		1000	1217	1585	155
25/100	25	750	960	1470	84
		1000	1245	1760	112
		1500	1817	2330	167
30/120	30	1000	1266	1880	93
		1500	1837	2451	139
		2000	2409	3023	186
40/150	40	1500	1878	2697	105
		2000	2450	3269	139
		2500	3021	3840	174
50/200	50	2000	2490	3514	112
		2500	3062	4086	139
		3000	3633	4657	167
60/250	60	2000	2531	3760	93
		3000	3674	4903	139
		4000	4817	6046	186
70/300	70	3000	3715	5149	120
		4000	4858	6291	159
		5000	6001	7434	199
80/350	80	3000	3756	5394	105
		4000	4899	6537	139
		5000	6042	7680	174

Modello	Potenza con primario 80-60°C	Capacità Accumulo	TA 60°C; Tout ACS 45°C: Tin ACS 10°C		
	kW	l	l/10 min	l/60 min	Tempo ripristino ACS
12/35	35	200	429	1150	20
		300	572	1290	30
		500	858	1575	50
18/70	70	500	1001	2433	25
		750	1358	2790	37
		1000	1715	3150	50
25/100	100	750	1481	3530	26
		1000	1838	3900	35
		1500	2552	4600	52
30/120	120	1000	1920	4377	29
		1500	2634	5091	44
		2000	3349	5805	58
40/150	150	1500	2757	5829	35
		2000	3471	6543	46
		2500	4186	7257	58
50/200	200	2000	3676	7771	35
		2500	4390	8486	44
		3000	5105	9200	52
60/250	250	2000	3881	9000	28
		3000	5310	10429	42
		4000	6738	11857	56
70/300	300	3000	5514	11657	35
		4000	6943	13086	46
		5000	8371	14514	58
80/350	350	3000	5719	12886	30
		4000	7148	14314	40
		5000	8576	15743	50

7. Pericoli e precauzioni

Ricordiamo che l'utilizzo di prodotti costituiti da recipienti in pressione e che impiegano energia elettrica ed acqua, comporta l'osservanza di alcune regole fondamentali quali:

- è consentito l'uso dell'apparecchio esclusivamente con acqua sanitaria;
- è vietato utilizzare l'apparecchio con pressioni e temperature dei fluidi maggiori di quelle massime ammesse;
- è vietato eseguire qualsiasi intervento o operazione di manutenzione sul prodotto senza aver portato il recipiente a pressione atmosferica;
- è vietato eseguire qualsiasi intervento o operazione di manutenzione sul prodotto senza aver verificato le temperature del fluido, del recipiente e senza essersi adeguatamente protetti dal calore;
- è vietato toccare l'apparecchio se si è a piedi nudi e con parti del corpo bagnate o umide;
- è vietato eseguire qualsiasi intervento o operazione di manutenzione sul prodotto prima di aver scollegato l'apparecchio dalla rete di alimentazione elettrica;
- è vietato modificare i dispositivi di sicurezza;
- è vietato disperdere, abbandonare o lasciare alla portata dei bambini il materiale d'imballo (cartone, graffe, sacchetti di plastica, ecc.) in quanto può essere potenziale fonte di pericolo;
- è vietato l'uso del prodotto ai bambini.



Disconnettere il serbatoio e lo scambiatore di calore dall'impianto prima di effettuare saldature.

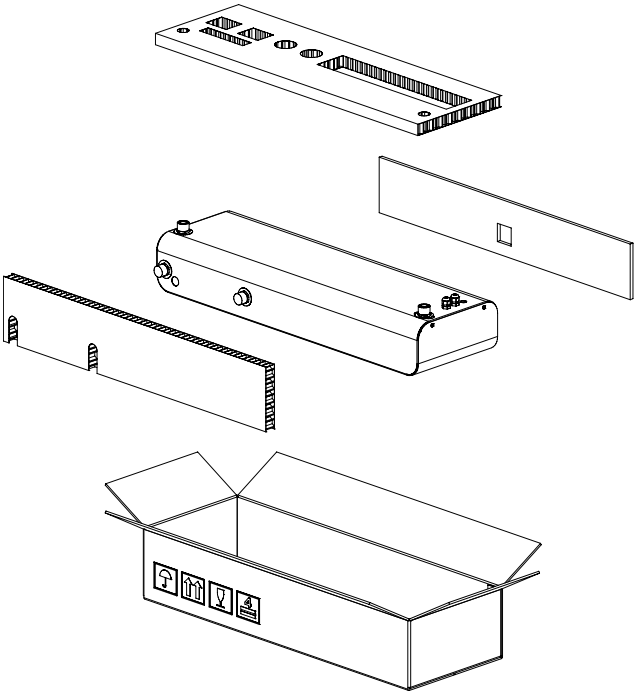
8. Installazione ed uso

8.1 Imballaggio del prodotto

Il prodotto viene spedito imballato in una scatola.
Aprire la scatola dal lato superiore e, se necessario, dai lati.
Nel caso sia consegnato su pallet occorre togliere la copertura di polipropilene che protegge il prodotto, rimuovere i dispositivi che lo fissano quindi toglierlo dal pallet.

Occorre smaltire sempre gli imballi nei modi e nei tempi consentiti dalle vigenti normative; il legno può essere bruciato mentre il polipropilene non deve essere nè bruciato nè disperso nell'ambiente.

Legno e chiodi potrebbero provocare serie ferite; usare guanti di protezione individuale.



8.2 Movimentazione del prodotto

Il prodotto deve essere tolto dall'imballo e movimentato con appropriati mezzi di sollevamento quali:

- carrello elevatore a forche
- gru a braccio provvista di imbragature in tessile di portata adeguata al peso da sollevare ed in buono stato di conservazione.



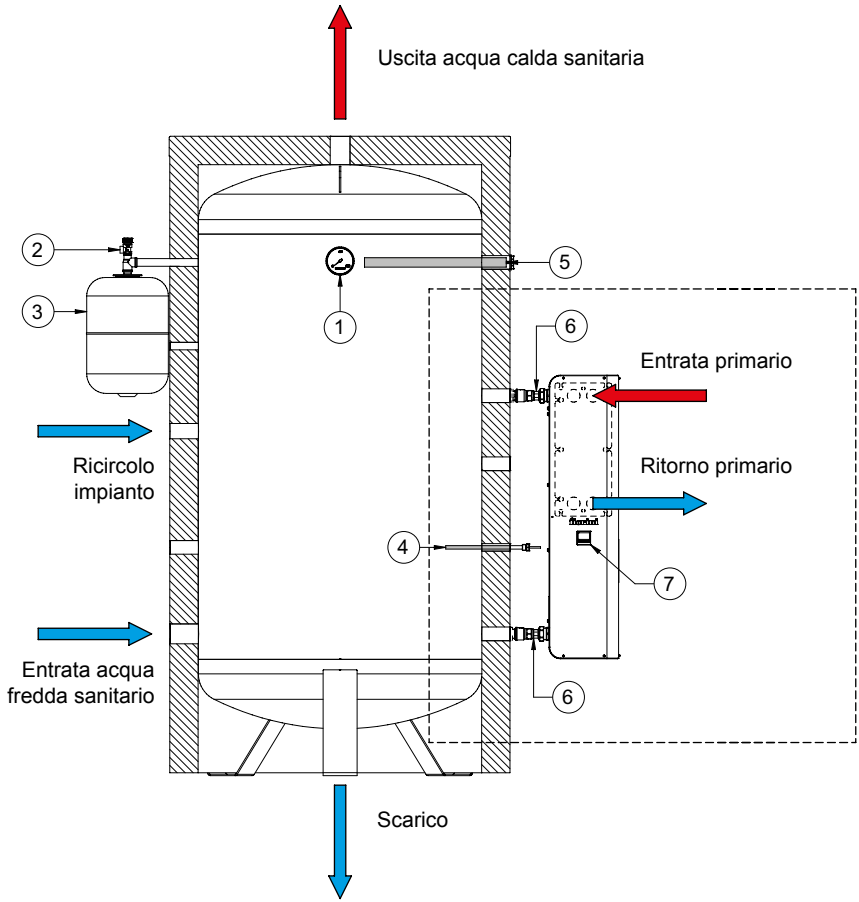
Durante il sollevamento e la movimentazione del prodotto occorre prestare attenzione a non danneggiarlo.

8.3 Luogo d'installazione

- Verificare che la superficie su cui sarà installato il prodotto sia piana e idonea a sostenere il peso del prodotto stesso.
- Verificare che sul lato dell'accumulo sul quale si intende montare il preparatore rapido per ACS vi sia spazio sufficiente per eseguire l'installazione ed i successivi interventi di manutenzione.
- Tenere conto del peso del kit indicato nella tabella sottostante.

Peso complessivo kit			
Taglia	**Peso netto (kg)**	**Volume circuito serbatoio (l)**	**Volume circuito primario (l)**
12/35	21 kg	1,02	1,02
18/70	23 kg	1,41	1,41
25/100	25 kg	1,92	1,92
30/120	43 kg	1,43	1,43
40/150	45 kg	1,72	1,72
50/200	47 kg	2,29	2,29
60/250	49 kg	2,86	2,86
70/300	52 kg	3,43	3,43
80/350	53 kg	3,72	3,72

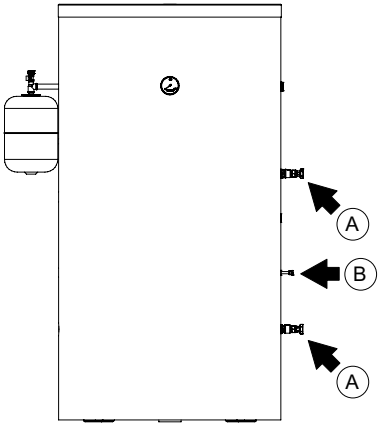
8.4 Schema di installazione



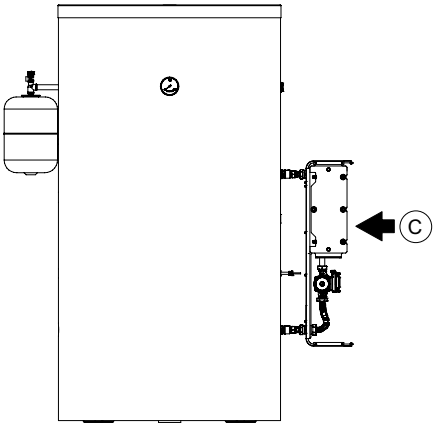
Rif.	Descrizione
1	Termometro
2	Valvola di sicurezza
3	Vaso d'espansione
4	Sonda
5	Anodo
6	Valvola a sfera d'intercettazione
7	Controllore elettronico

8.5 Installazione

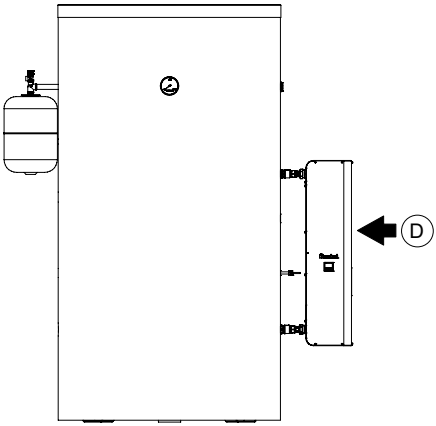
- Montare i raccordi e le valvole con girello **A** sul serbatoio.
- Installare il pozzetto **B** sul serbatoio.



- Verificare l'interasse delle connessioni e se necessario regolarlo sul kit.
- Collegare il kit **C** al serbatoio tramite i girelli sulle valvole.



- Collegare il cavo pompa.
- Installare la copertura **D**.



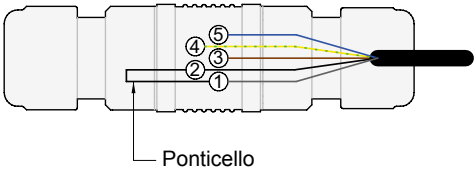
- Eseguire i collegamenti alle tubazioni di mandata e ritorno (vedi *"Schema d'installazione"*) in modo tale che questi:
  - non gravino con il loro peso sul prodotto stesso;
  - consentano l'accesso e lo smontaggio dello scambiatore, della pompa di circolazione e di tutti gli altri elementi (vedi *"Luogo d'installazione"*);
  - garantiscano la tenuta del fluido in pressione contenuto nell'accumulo.
- Montare una valvola di sicurezza sul circuito sanitario con pressione di intervento non superiore a quella nominale dei componenti installati e, in particolare, del serbatoio, conforme alla Direttiva 2014/68/UE e con orifizio di diametro adeguato.
- Dotare l'impianto di vaso di espansione sul circuito sanitario conforme alla Direttiva 2014/68/UE e di capacità adeguata al volume ed alle temperature dell'impianto, al fine di proteggere lo stesso da eventuali sovrapressioni.
- Montare una valvola di sicurezza sul circuito primario con pressione di intervento non superiore a quella nominale dei componenti installati, conforme alla Direttiva 2014/68/UE e con orifizio di diametro adeguato.
- Dotare l'impianto di vaso di espansione sul circuito primario conforme alla Direttiva 2014/68/UE e di capacità adeguata al volume ed alle temperature dell'impianto, al fine di proteggere lo stesso da eventuali sovrapressioni.
- I collegamenti elettrici devono essere realizzati da personale abilitato nel rispetto delle norme vigenti secondo quanto specificato dal costruttore della pompa.
- Prevedere la possibilità di eseguire lo scarico del serbatoio, senza mettere lo stesso in depressione eventualmente utilizzando un'idonea valvola rompivuoto.
- **Collegare la massa metallica del serbatoio all'anodo sacrificale, in dotazione, mediante l'apposito connettore, se presente.**
- **Collegare la massa metallica del serbatoio a terra.**
- **Controllare la durezza dell'acqua che dovrà essere non inferiore a 15°f e non superiore a 35°f (gradi Francesi).**
- Il kit dovrà essere connesso elettricamente dall'installatore.
- Prevedere una protezione elettrica esterna per il produttore rapido.
- Verificare che tensione e frequenza della rete di alimentazione corrispondano ai valori riportati sulla targa dati.
- Il motore a corrente continua con controllo elettronico si comporta, dal punto di vista elettrico, come un condensatore per cui, quando viene alimentato, è caratterizzato da un assorbimento elevato simile ad una corrente di spunto che può raggiungere 10,3 A.
- Collegare il kit alla rete di alimentazione utilizzando il cavo in dotazione, aprire il giunto ed utilizzare i seguenti morsetti:

  5 - Neutro

  4 - Terra

  3 - Fase

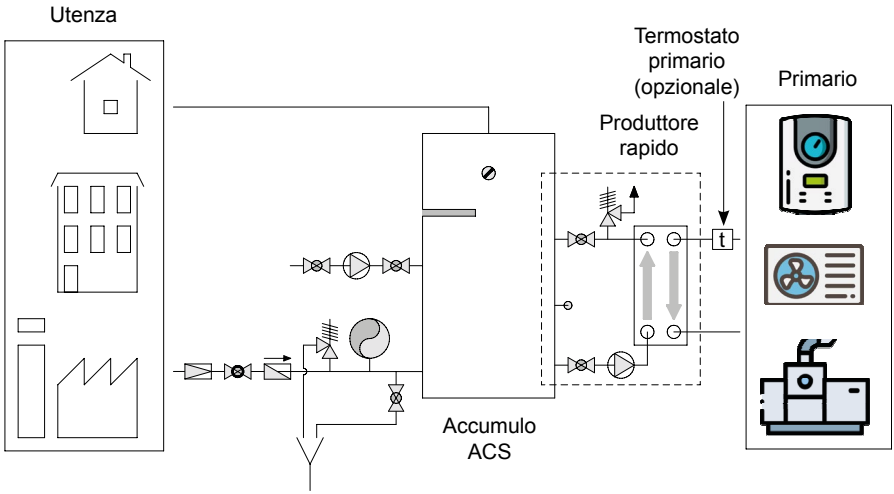
  - Il ponticello 2-1 va rimosso per collegare il termostato primario e\o avvio remoto; va lasciato in tutti gli altri casi.



- Il kit è dotato di controllore elettronico con funzione termostato. Il termostato controlla la temperatura dell'accumulo ramite una sonda PT100.

- Nel termostato sono presenti tre tipi di set-point che corrispondono a:
  - C1.SE - Set-point accumulo;
  - C2.SE - Set-point ciclo antilegionella;
  - A1.SE - deviazione su C1 (sempre 0).
- Il set-point indica la temperatura che deve raggiungere l'accumulo per fermare la richiesta di acqua calda ed il circolatore.
- La richiesta viene ripristinata quando la temperatura dell'accumulo scende sotto il valore di set-point - isteresi (C1.SE - C.HYS e C1.SE - A1.SE - A1.HY). Le due isteresi devono essere impostate allo stesso valore.

Consultare il manuale del controllore per reperire le informazioni su come modificare il valore di set-point - isteresi.



8.6 Ciclo antilegionella

Chiudendo il contatto "attivazione SetPoint antilegionella" (morsetti 6-7, vedi par. 12.2) viene attivato il SetPoint C2.SE.

La durata della chiusura del contatto dovrà essere regolata dal gestore ciclo antilegionella assicurandosi che sia adeguata a raggiungere i 65°C per almeno 15 minuti.

8.7 Messa in servizio

Per una corretta messa in servizio si raccomanda:

- l'installazione sul circuito sanitario e sul circuito primario di una valvola di sicurezza e di un vaso di espansione aventi caratteristiche adeguate;
- il collegamento alla massa metallica del serbatoio dell'anodo sacrificale;
- il controllo della durezza dell'acqua di rete (**la garanzia decade per durezze inferiori a 15°f e superiori a 35°f**).

Accertarsi che la pressione non superi in nessun caso quella di esercizio del serbatoio.

La temperatura nel serbatoio del gruppo di accumulo non dovrà superare i 65°C in modo permanente sia per ragioni di contenimento dei consumi energetici sia per ridurre i fenomeni di corrosione elettrogalvanica e di incrostazione da depositi calcarei.

È consentito superare temporaneamente tale valore di temperatura in occasione del periodico trattamento anti-legionella che le norme sanitarie suggeriscono per contenitori d'acqua calda per uso umano.
La temperatura non dovrà superare in nessuna circostanza il valore massimo ammissibile per il serbatoio e per gli altri componenti del circuito e, in ogni caso, rimanere al di sotto di 95°C.

Se necessario mettere in atto le precauzioni necessarie ad evitare che all'utenza possa arrivare acqua sanitaria a temperatura tale da provocare danni o disagi.

8.8 Termostato primario

È possibile installare un termostato sulla tubazione di mandata del primario per garantire l'avvio pompa Aquafast solo quando l'acqua è in temperatura.
Il termostato deve chiudere il contatto quando la temperatura è superiore al valore impostato.
Il contatto del termostato va collegato al posto del ponticello sui morsetti rif. 2-1 (vedi pag. 13).

8.9 Avvio remoto

È possibile avviare l'Aquafast da remoto (solo in caso la temperatura accumulo sia sotto al setpoint impostato) eliminando il ponticello sui morsetti rif. 2-1 (vedi pag. 13) e collegando il contatto di avvio al suo posto.

È possibile combinare il termostato primario e l'avvio remoto collegando in serie i contatti.

9. Manutenzione

Per un corretto funzionamento nel tempo degli accumuli rapidi si richiede di:

- verificare periodicamente l'anodo sacrificale (la prima volta non oltre 6 mesi dall'installazione) e sostituirlo quando presenta segni di usura o almeno una volta l'anno;
- verificare periodicamente il funzionamento della valvola di sicurezza dell'impianto;
- verificare periodicamente la precarica dei vasi d'espansione;
- verificare periodicamente l'assenza di eventuali perdite;
- pulire periodicamente il lato sanitario dello scambiatore a piastre mediante le apposite soluzioni in commercio, rispettando le modalità d'uso e le norme di sicurezza o ispezionando le piastre. Attenersi alle indicazioni riportate nel manuale dello scambiatore;
- attuare periodicamente un trattamento termico anti legionella (L.G.A. 2000, Gazz. Uff. n°103).

10. Smaltimento

Alla fine del ciclo di lavoro dell'apparecchio si raccomanda di non disperderne le parti nell'ambiente, ma affidarsi a ditte specializzate in grado di provvedere allo smaltimento nel rispetto delle normative vigenti.

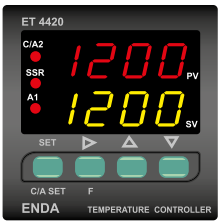
11. Eventuali anomalie e possibili rimedi

Anomalia	Causa	Rimedio
L'accumulo rapido non raggiunge la temperatura richiesta.	Termostato impostato ad una temperatura errata.	Agire sulla regolazione del termostato ed impostare la temperatura desiderata. NOTA: non superare la temperatura massima indicata sulla targhetta dati tecnici.
	Termostato non funzionante.	Sostituire il termostato con un modello analogo.
	Termostato mal collegato.	Controllare il collegamento attenendosi alle indicazioni presenti nel manuale del prodotto.
	Avaria componenti circuito primario.	Verificare i componenti del circuito primario.
	Guasto pompa circuito sanitario.	Attenersi a quanto indicato nel manuale del costruttore della pompa.
	Scambiatore di calore sporco.	Pulire lo scambiatore seguendo le istruzioni riportate nell'apposito manuale.
La produzione di acqua calda sanitaria è insufficiente.	Temperatura di stoccaggio troppo bassa.	Aumentare la temperatura di stoccaggio mediante il termostato in dotazione. NOTA: non superare la temperatura massima indicata sulla targhetta dati tecnici.
	Potenza del circuito primario insufficiente.	Verificare la funzionalità ed il dimensionamento dei componenti del circuito primario quali pompe, valvole, tubi e generatori di calore.
	Errato collegamento del circuito primario allo scambiatore di calore.	Eseguire collegamento come da schema a pagina 12-13.
	Scambiatore di calore sporco.	Pulire lo scambiatore seguendo le istruzioni riportate nell'apposito manuale.
	Prelievo superiore alla potenzialità del gruppo.	Sostituire il gruppo avvalendosi della consulenza del nostro personale qualificato.

Anomalia	Causa	Rimedio
Sovratemperatura.	Termostato impostato ad una temperatura errata.	Agire sulla regolazione del termostato ed impostare la temperatura desiderata. NOTA: non superare la temperatura massima indicata sulla targhetta dati tecnici.
	Termostato mal collegato.	Controllare il collegamento attenendosi alle indicazioni presenti nel manuale del prodotto.
	Termostato non funzionante.	Sostituire il termostato con un modello analogo.
	Guasto presente sul circuito primario.	Verificare il circuito primario.
Perdite di acqua.	Tubazioni mal collegate.	Collegare le tubazioni in maniera corretta.
	Perdite dallo scambiatore.	Vedere manuale scambiatore di calore.
Sporcamento precoce dello scambiatore di calore.	Acqua eccessivamente dura.	Provvedere all'inserimento di un addolcitore attenendosi alle specifiche d'installazione.
	Temperatura del circuito primario troppo alta.	Diminuire la temperatura del circuito primario. Eventualmente inserire una valvola miscelatrice sul circuito primario.

Riscontrando inconvenienti non elencati in questo capitolo interpellare il Servizio Assistenza Tecnica oppure il Costruttore.

12. Controllore elettronico



§ Impostazione dei parametri

- Tenere premuto il tasto SET C/A SET e premere il tasto F per visualizzare il primo menù quindi rilasciare i tasti.
- Premere il tasto F per passare al menù successivo.

Elenco dei menù

Con.o.	Configurazione relè 1
AL 1.o.	Configurazione relè 2 - Allarme 1
AL2.o.	Configurazione relè 2 - Allarme 2
ConF.	Configurazione dispositivo
S.tun.	Auto tuning, non utilizzato
SECU.	Sicurezza

- Premere i tasti ▲ e ▼ per scorrere i parametri del menù visualizzato.
- Tenere premuto il tasto SET C/A SET e con i tasti ▲ e ▼ variare il valore del parametro visualizzato.
- Tenere premuto il tasto SET C/A SET e premere il tasto F per uscire dalla modalità “Programmazione” oppure attendere 20 secondi.

per poter variare i valori nei menù occorre impostare la relativa voce nel menù sicurezza su P.YES

§ Impostazione dei Set-Point



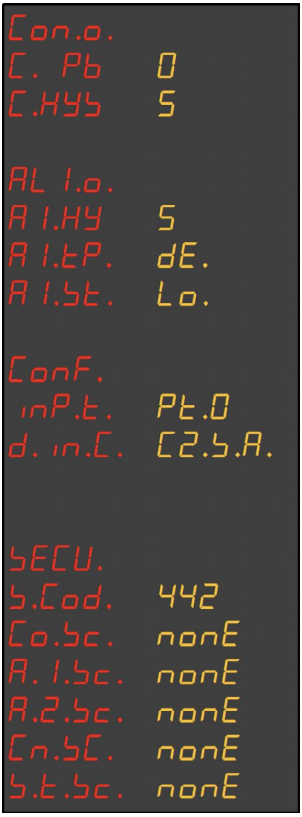
- Premere il tasto SET C/A SET per visualizzare il primo Set-Point.
- Premere nuovamente il tasto SET C/A SET per passare al Set-Point successivo.

Elenco dei Set-Point

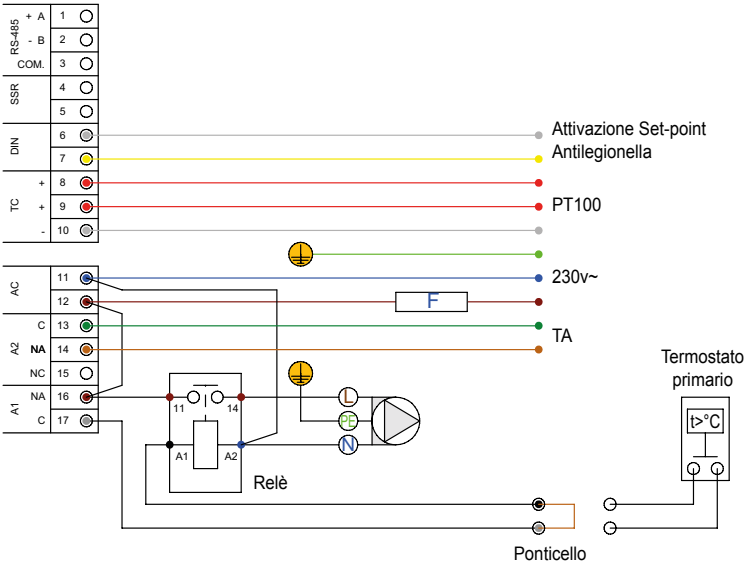
C 1.SE.	Set-Point principale
C2.SE.	Set-Point ciclo antilegionella
A 1.SE.	Differenziale relé 2, impostare sempre a 0

- Premere i tasti ▲ e ▼ per variare il Set-Point visualizzato.
- Attendere 3 secondi per uscire dalla modalità “Impostazione Set-Point”.

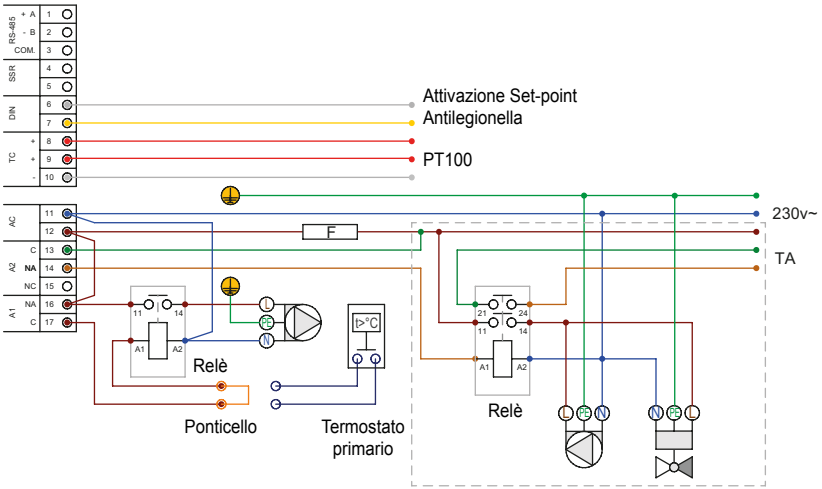
12.1 Impostazioni controllore



12.2 Schema collegamento morsettiera



12.3 Schema collegamento morsettiera “extended”



13. ModBUS

Il controllore è dotato di porta di comunicazione via protocollo ModBus RTU del tipo RS485. Il cavo ModBus va collegato sui piedini 1(A) 2 (B) e 3 (COM).
I parametri di comunicazione di default sono: ID = 1, Baud = 9600, 8 Bit, No parity, 1 Bit stop.

13.1 Memory Map for Holding Registers

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
Control Output Parameters	H0	0000d	(0000h)	Word	Control output, temperature setpoint value	Read / Write	400
	H1	0001d	(0001h)	Word	Control output, 2nd temperature setpoint value	Read / Write	400
	H2	0002d	(0002h)	Word	Control output, minimum setpoint value	Read / Write	0
	H3	0003d	(0003h)	Word	Control output, maximum setpoint value	Read / Write	600
	H4	0004d	(0004h)	Word	Control output, proportional band setpoint value (Adjustable between %0.0 and %100.0)	Read / Write	4
	H5	0005d	(0005h)	Word	Control output, hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H6	0006d	(0006h)	Word	Control output, integral time (Adjustable between 0.1 and 100.0 minute)	Read / Write	40
	H7	0007d	(0007h)	Word	Control output, derivative time (Adjustable between 0.01 and 10.00 minute)	Read / Write	100
	H8	0008d	(0008h)	Word	Control output, time period setpoint value (Adjustable between 1 and 125 second)	Read / Write	20
	H9	0009d	(0009h)	Word	Control output, set value power ratio (Adjustable between %0 and % 100)	Read / Write	0
	H10	0010d	(000Ah)	Word	Control output, set value power ratio in case of sensor failure (Adjustable between %0 and %100)	Read / Write	0
	H11	0011d	(000Bh)	Word	Control output, soft start value	Read / Write	0
A1 Output Parameters	H12	0012d	(000Ch)	Word	Alarm1 output temperature setpoint value	Read / Write	500
	H13	0013d	(000Dh)	Word	Alarm1 output minimum setpoint value limit	Read / Write	0
	H14	0014d	(000Eh)	Word	Alarm1 output maximum setpoint value limit	Read / Write	600
	H15	0015d	(000Fh)	Word	Alarm1 output proportional band set value (Adjustable between %0.0 and %100.0)	Read / Write	0
	H16	0016d	(0010h)	Word	Alarm1 output hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H17	0017d	(0011h)	Word	Alarm1 output, integral time (Adjustable between 0.1 and 100.0 minute)	Read / Write	0
	H18	0018d	(0012h)	Word	Alarm1 output, derivative time (Adjustable between 0.01 and 10.00 minute)	Read / Write	0
	H19	0019d	(0013h)	Word	Alarm1 output, time period setpoint value (Adjustable between 1 and 125 second)	Read / Write	20

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
A1 Output Parameters	**H20**	0020d	(0014h)	Word	Alarm 1 output, set value power ratio (Adjustable between %0 and % 100)	Read / Write	0
	H21	0021d	(0015h)	Word	Alarm1 output, set value power ratio in case of sensor failure (Adjustable between %0 and %100)	Read / Write	0
	H22	0022d	(0016h)	Word	Alarm1 output type selection (Values can be given from O to 4) (0 = Independent alarm, 1 = Deviation alarm, 2 = Band alarm, 3 = Active alarm after in band time, 4 = Alarm1 output, cooling control selection)	Read / Write	0
A2 Output Parameters	**H23**	0023d	(0017h)	Word	Alarm2 output, temperature setpoint value	Read / Write	500
	H24	0024d	(0018h)	Word	Alarm2 output minimum setpoint value limit	Read / Write	0
	H25	0025d	(0019h)	Word	Alarm2 output maximum setpoint value limit	Read / Write	600
	H26	0026d	(001Ah)	Word	Alarm2 output, hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H27	0027d	(001Bh)	Word	Alarm2 output type selection (Values can be given from O to 3) (0 = Independent alarm, 1 = Deviation alarm, 2 = Band alarm, 3 = Active alarm after in band time)	Read / Write	0
Configuration Parameters	**H28**	0028d	(001Ch)	Word	Input selection number (0 = PT100 Decimal, 1 = Pt100 Non-decimal, 2 = J Decimal, 3 = J Non-decimal, 4 = K Decimal, 5 = K Non-decimal, 6 = L Decimal, 7 = L Non-decimal, 8 = T Decimal, 9 = T Non-decimal, 1 0= S Non-decimal, 11 = R Non-decimal	Read / Write	5
	H29	0029d	(001Dh)	Word	ModBus device address (Adjustable between 1 and 247)	Read / Write	1
	H30	0030d	(001Eh)	Word	Modbus communication speed (Baudrate) (0 = Modbus cancel, 1 = 2400 bps, 2 = 4800 bps, 3 = 9600 bps, 4 =19200 bps, 5 = 38400 bps)	Read / Write	3
	H31	0031d	(001Fh)	Word	Digital filter coefficient (Adjustable between 1 and 200, 1 = filter is disable)	Read / Write	10
	H32	0032d	(0020h)	Word	Control output, selection value (0 = C/A2 Control output selection, 1 = SSR Output)	Read / Write	0
	H33	0033d	(0021h)	Word	Reserved	Read / Write	XX
	H34	0034d	(0022h)	Word	Reserved	Read / Write	XX
	H35	0035d	(0023h)	Word	Offset value	Read / Write	0
	H36	0036d	(0024h)	Word	Function control parameter. (23040d (5A00h) self tune stops when this value is entered) (23041d (5A01h) self tune starts when this value is entered) (23042d (5A02h6) returns to factory defaults when this value is entered)	Read / Write	0

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
Configuration Parameters	**H37**	0037d	(0025h)	Word	Reserved	Read / Write	XX
	H38	0038d	(0026h)	Word	Reserved	Read / Write	XX
	H39	0039d	(0027h)	Word	Manual control output percentage (Adjustable between %0 and % 100)	Read / Write	50
	H40	0040d	(0028h)	Word	Digital input control parameter (O = Digital input off, 1 = 2nd set value is selected with digital input, 2 = Manual mode is entered via digital input, 3 = Digital input is passed to display mode	Read / Write	0
	H41	0041d	(0029h)	Word	Functionk ey controlp arameter(0 = Function key off, 1 = 2nd Set value is selected with function key, 2 = Manual mode is entered via function key, 3 = With the function key display mode is entered)	Read / Write	0
	H42	0042d	(002Ah)	Word	Reserved	Read / Write	XX
	H43	0043d	(002Bh)	Word	Reserved	Read / Write	XX
	H44	0044d	(002Ch)	Word	Reserved	Read / Write	XX
	H45	0045d	(002Dh)	Word	Reserved	Read / Write	XX
	H46	0046d	(002Eh)	Word	Reserved	Read / Write	XX
	H47	0047d	(002Fh)	Word	Reserved	Read / Write	XX
	H48	0048d	(0030h)	Word	Control output menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H49	0049d	(0031h)	Word	Alarm1 output menu security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H50	0050d	(0032h)	Word	Alarm2 output menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H51	0051d	(0033h)	Word	Configuration menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H52	0052d	(0034h)	Word	Self tune menu, security parameter (0 = Menu invisible, 1 = Self tune can be done)	Read / Write	1

13.2 Memory Map of Coils

Par. Nr	Coil Adresses	Data type	Data Content	Read Write Permission	Factory Defaults
C0	(0000)h	Bit	Alarm2 Status (0 = Active Low, 1 =Active High)	Read / Write	1
C1	(0001)h	Bit	Alarm2 output position in case of Prob failure (0 = Off, 1 = On)	Read / Write	0
C2	(0002)h	Bit	Alarm1 Status (0 = Active Low, 1 =Active High)	Read / Write	1
C3	(0003)h	Bit	Alarm1 output position in case of Prob failure (0 = Off, 1 = On)	Read / Write	0
C4	(0004)h	Bit	Control output configuration (0 = Heat ; 1 = Cool)	Read / Write	0

Par. Nr	Coil Adresses	Data type	Data Content	Read Write Permission	Factory Defaults
C5	(0005)h	Bit	Temperature unit (0 = °C ; 1 = °F)	Read / Write	0
C6	(0006)h	Bit	Control outputs active (0 = Control outputs active, 1 = Only display mode)	Read / Write	0
C7	(0007)h	Bit	Controlling according to 2nd temperature setpoint (If C7 = 0 is H0, if C7 = 1 is H1)	Read / Write	0
C8	(0008)h	Bit	Auto/Manual selection (0 = Automatic “Running mode”, 1 = Manual “Running mode”. In this mode, output generated according to H39 parameter)	Read / Write	0
C9	(0009)h	Bit	Control fonmat in case of probe failure (0 = H 10 proportional control according to percentage value, 1 = Error found before the setpoint control is done with the value of the proportional control	Read / Write	0

13.3 Memory Map for Input Registers

Par. Nr	Input Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission
I0	0000d	(0000h)	Word	Measured temperature	Read Only
I1	0001d	(0001h)	Word	Percentage of analog output	Read Only
I2	0002d	(0002h)	Word	Measurement error codes 0 = No error, 1 = Sensor disconnected or broken, 2 = Lower scale error, 3 = Upper scale error, 4 = PT100 short circuit or temperature too low, 5 = Wrong input selection	Read Only
I3	0003d	(0003h)	Word	Self tune condition codes 0 = No error, 1 = Initial temperature is higher than 60% setpoint value, 2 = Calculating PIO parameters, 3 = Calculating power set parameters	Read Only
I4	0004d	(0004h)	Word	Current (active) temperature setpoint	Read Only
I5	0005d	(0005h)	Word	Reserved	Read Only
I6	0006d	(0006h)	Word	Current (active) decimal point value (0 = No decimal point, 1 = 0.0 Decimal point is tenths	Read Only

13.4 Memory Map for Software Revision Input Registers

Software Revision	61472d (F020h)	14 Word	Software name and update is read in ASCII format and as 14 word. Sample: ET4420-01 03 Dec 2013. Memory Formats: Word 1 … Word 14 T E 4 4 0 2 0 - 1 3 0 D C E 2 1 0 . 3 **Note: To view each word correctly by changing the byte sequences should be displayed as ASCII TEXT**	Read Only

13.5 Memory Map for Discrete Input

Par. Nr	Discrete Input Adresses	Data type	Data Content	Read Write Permission
D0	(0000)h	Bit	C/A2. Control output status (0 = OFF , 1 = ON)	Read Only
D1	(0001)h	Bit	A1 Output status (0 = OFF , 1 = ON)	Read Only
D2	(0002)h	Bit	SSR Output status (0 = OFF , 1 = ON)	Read Only
D3	(0003)h	Bit	Digital input status (0 = OFF , 1 = ON)	Read Only

13.6 ModBUS error messages

Mod bus protocol has two types error, communication error and operating error. Reason of the communication error is data corruption in transmission. Parity and CRC control should be done to prevent communication error. Receiver side checks parity and CRC of the data. If they are wrong, the message will be ignored. If format of the data is true but function doesn't perform for any reason, operating error occurs. Slave realizes error and sends error message. Most significant bit of function is changed '1' to indicate error in error message by slave. Error code is sent in data section. Master realizes error type via this message.

ModBUS Error Codes

Error Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the slave.
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the slave.

Message example:

Structure of command message (Byte format)

Device Addess		(0A)h
Function Code		(01)h
Beginning address of coils	MSB	(04)h
	LSB	(A1)h
Number of coils (N)	MSB	(00)h
	LSB	(01)h
CRC DATA	MSB	(AC)h
	LSB	(63)h

Structure of response message (Byte format)

Device Addess		(0A)h
Function Code		(81)h
Error Code		(02)h
CRC DATA	MSB	(B0)h
	LSB	(53)h

As you see in command message, coil information of (4A 1)h = 1185 is required but there isn't any coil with 1185 address. Therefore error code with number (02) (Illegal Data Address) sends.

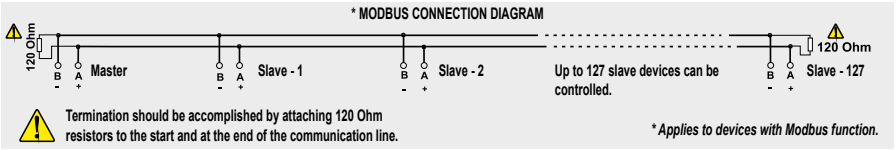


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1. Symbols

In this manual the following symbols may be used:



DANGER: indicates actions which, if not correctly performed, can cause serious injury.



PROHIBITION: indicates actions that impose a prohibition.



DANGER, VOLTAGE: indicates actions which, if not correctly performed, can result in death or serious injury to exposed persons.



DANGER, HIGH TEMPERATURE: indicates actions which, if not correctly performed, can result in thermal injury caused by contact with hot components.



IMPORTANT: directs attention to technical information or practical advice for a more effective and efficient use of the appliance.



MANDATORY: indicates actions that prescribe a specific behaviour for a proper operation of the appliance.

2. General information

Keep the manual in a dry place, to avoid deterioration, for at least 10 years for future reference.
Read all the information contained in this manual carefully and thoroughly.
Pay particular attention to the rules of use accompanied by the words "**DANGER**" and "**PROHIBITION**" as, if not observed, can cause injury and damage to the appliance and/or property.
For any problem not covered by this manual, contact the Service Centre.
The manufacturer declines all responsibility for damage due to improper use of the appliance or to partial or superficial reading of the information contained in this manual.
The appliance must be installed in such a way as to make any maintenance and/or repair possible.
The warranty on the appliance does not in any case cover the costs of aerial ladders, scaffolding or other lifting systems that may be necessary for repair or replacement under warranty.
The manufacturer reserves the right to make changes to this document without prior notice and without expressed or implied obligation to notify any person of such changes.
Reproduction and/or disclosure to third parties or competitors of this document or any part thereof, is expressly forbidden.

This manual is an integral and essential part of the product and as such must always accompany the product. If the data plate or the manual becomes lost or illegible, request a copy from the manufacturer.

3. Product description

The product consists of a highly efficient gasketed plate heat exchanger complete with fittings, circulation pump, insulated box, electronic controller and temperature probe.
The fast heater for domestic hot water can be combined with DHW tanks and heating boilers, regardless of their capacity.
The possibility to combine the kit with storage tanks regardless of their type and volume provides an array of solutions for the instantaneous production of domestic hot water for small and medium-sized buildings including homes, restaurants, hotels, sports centres, etc.
If compared to traditional systems with spiral-tube heat exchangers, the advantages offered by combining a storage tank with a plate exchanger are the following:

- use of lower-capacity storage tanks to reduce the mechanical footprint keeping however unaltered the amount of DHW supplied;
- optimised operation by combining the power from the heater (or heat generator) and the heat transfer capabilities of the exchanger
- faster DHW recovery times.

3.1 Model and type

Fast heater for instantaneous DHW production

Fast heater size (kW) ……

Tank capacity (litres) ……

Write the kit size and the tank capacity checking the details in the data plate.

3.2 Manufacturer

Fiorini Industries S.r.l.

Registered and administrative office: Via Zampeschi, 119 - 47122 FORLI' (FC) - ITALY
VAT number and tax code: 03948070408
Share capital: € 500,000.00 fully paid up
Registered in the Business Register of the Forlì-Cesena Province under no. 03948070408

3.3 CE marking

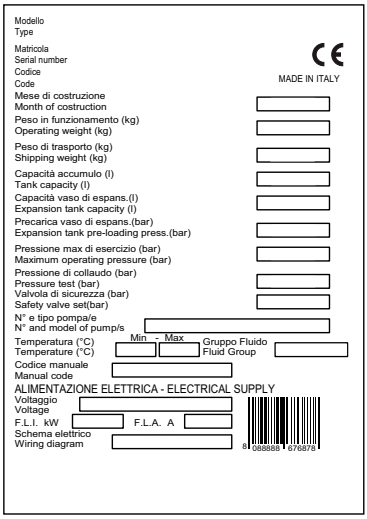
The product conforms to the provisions of specific directives of the European Union and bears the **CE** marking which is placed directly on the identification plate.

4. Compliance with EU Directives

Directive	Title
2006/42/EC	Machinery directive
2014/30/EU	Electromagnetic compatibility directive
2014/35/EU	Low voltage directive
2014/68/EU	PED, pressure equipment directive.

5. Identification

The product is identified by a data plate affixed directly to it.



6. Specifications of the units combined with the storage tank

Model	Power with primary at 55-50 °C	Storage capacity	AT 50 °C; DHW outT 45 °C: DW inT 10 °C		
	(kW)	(l)	l/10 min	l/60 min	DHW recovery time
12/35	12	200	278	523	46
		300	392	640	70
		500	621	870	116
18/70	18	500	645	1015	77
		750	931	1300	116
		1000	1217	1585	155
25/100	25	750	960	1470	84
		1000	1245	1760	112
		1500	1817	2330	167
30/120	30	1000	1266	1880	93
		1500	1837	2451	139
		2000	2409	3023	186
40/150	40	1500	1878	2697	105
		2000	2450	3269	139
		2500	3021	3840	174
50/200	50	2000	2490	3514	112
		2500	3062	4086	139
		3000	3633	4657	167
60/250	60	2000	2531	3760	93
		3000	3674	4903	139
		4000	4817	6046	186
70/300	70	3000	3715	5149	120
		4000	4858	6291	159
		5000	6001	7434	199
80/350	80	3000	3756	5394	105
		4000	4899	6537	139
		5000	6042	7680	174

Model	Power with primary at 80-60 °C	Storage capacity	AT 60 °C; DHW outT 45 °C: DW inT 10 °C		
	kW	l	l/10 min	l/60 min	DHW recovery time
12/35	35	200	429	1150	20
		300	572	1290	30
		500	858	1575	50
18/70	70	500	1001	2433	25
		750	1358	2790	37
		1000	1715	3150	50
25/100	100	750	1481	3530	26
		1000	1838	3900	35
		1500	2552	4600	52
30/120	120	1000	1920	4377	29
		1500	2634	5091	44
		2000	3349	5805	58
40/150	150	1500	2757	5829	35
		2000	3471	6543	46
		2500	4186	7257	58
50/200	200	2000	3676	7771	35
		2500	4390	8486	44
		3000	5105	9200	52
60/250	250	2000	3881	9000	28
		3000	5310	10429	42
		4000	6738	11857	56
70/300	300	3000	5514	11657	35
		4000	6943	13086	46
		5000	8371	14514	58
80/350	350	3000	5719	12886	30
		4000	7148	14314	40
		5000	8576	15743	50

7. Hazards and warnings

Remember that the use of products that use electricity and water involves the observance of a number of basic safety rules.

- Use the appliance with domestic water only.
- Do not use the appliance if the fluid pressure and temperature are above the maximum requirements.
- Do no carry out any repair or maintenance if the vessel is not at atmospheric pressure.
- Do no carry out any repair or maintenance before checking the temperatures of both fluid and vessel and wearing heat-resistant personal protective equipment.
- Do not touch the appliance when barefoot and with wet or damp parts of the body.
- Do no carry out any repair or maintenance without disconnecting the appliance from the mains supply.
- Do not tamper with the safety devices.
- Do not discard or leave within the reach of children packaging material (cardboard, staples, plastic bags, etc.) as it can be a potential source of danger.
- Do not allow children to use the fast heater.



Disconnect tank and heat exchanger from the system before carrying out any welding.

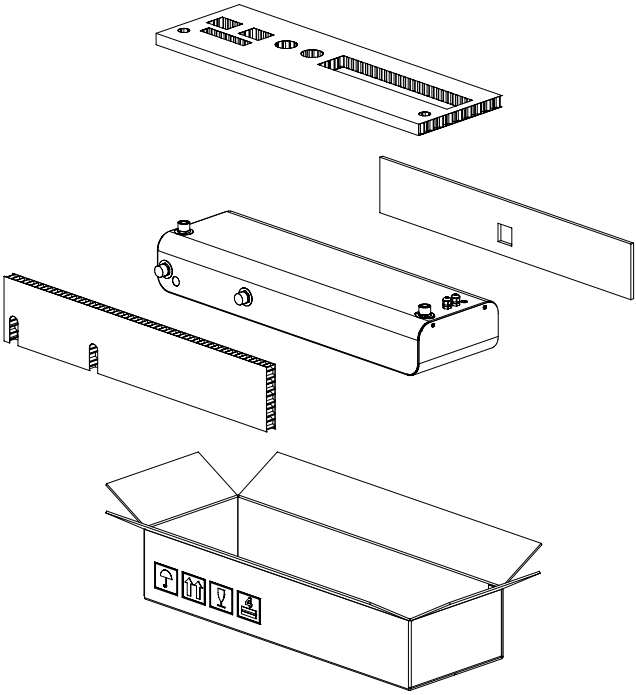
8. Installation and use

8.1 Packaging

The product is delivered inside a box.
Open the box top first, then remove the two sides, if necessary.
If the product is delivered on a pallet, remove the polypropylene protective film, cut any ties and remove the product from the pallet.

Dispose of any packaging materials according to any local and national regulations in force. Wood is safe to burn; polypropylene must neither be burnt nor released to the environment.

Wood and nails can cause serious injury. Use protective gloves.



8.2 Handling

Unpack and handle the product with adequate lifting means. Use:

- a forklift truck; or
- a boom crane with adequate textile slings having a suitable capacity for the load to be lifted and in good state of repair.



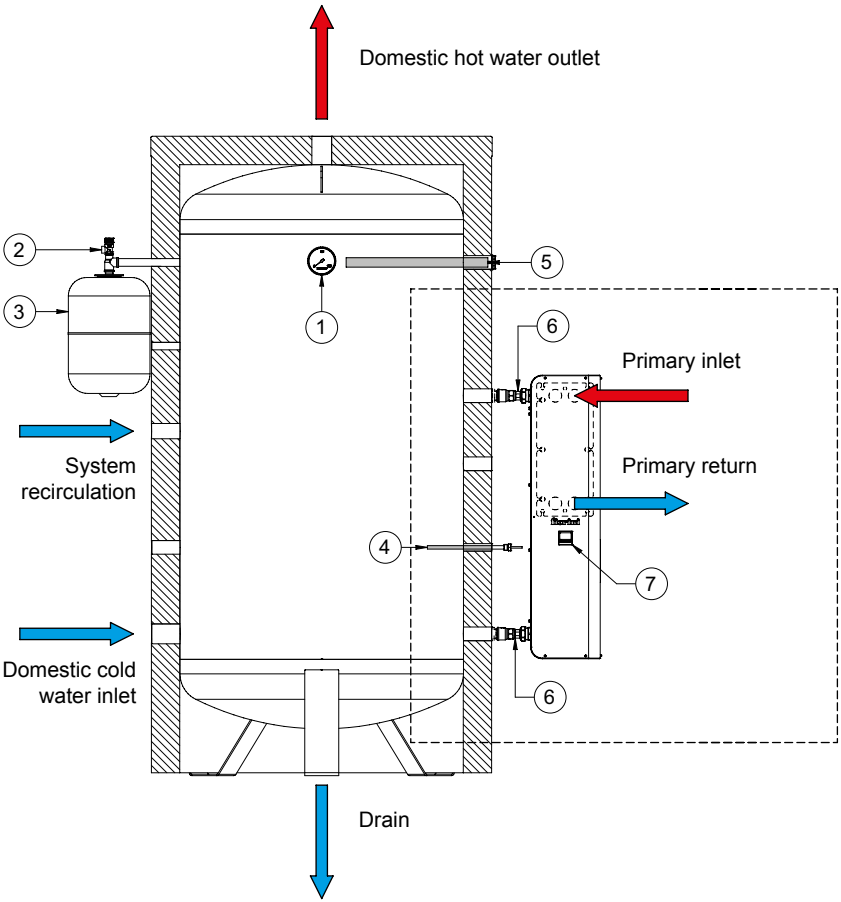
Be very careful when lifting and transporting the product to avoid damage.

8.3 Installation site

- Make sure the surface where the product will be installed is flat and able to withstand its weight.
- Make sure there is enough space on the storage side where the fast heater for DHW shall be installed, to move around it with ease during installation and maintenance.
- Factor in the weight of the kit given in the table below.

Kit total weight			
Size	**Net weight (kg)**	**Tank circuit volume (l)**	**Primary circuit volume (l)**
12/35	21 kg	1.02	1.02
18/70	23 kg	1.41	1.41
25/100	25 kg	1.92	1.92
30/120	43 kg	1.43	1.43
40/150	45 kg	1.72	1.72
50/200	47 kg	2.29	2.29
60/250	49 kg	2.86	2.86
70/300	52 kg	3.43	3.43
80/350	53 kg	3.72	3.72

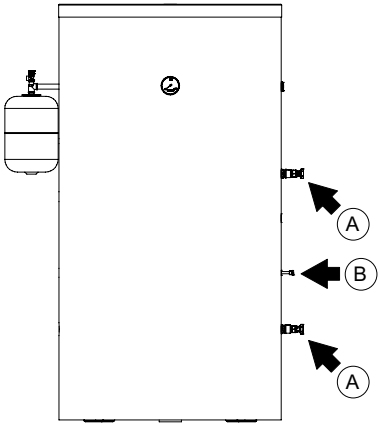
8.4 Installation diagram



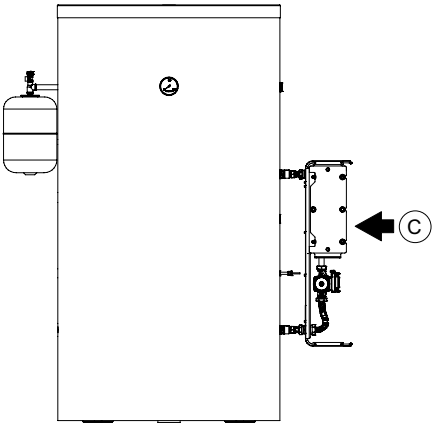
Ref.	Description
1	Thermometer
2	Safety valve
3	Expansion tank
4	Probe
5	Anode
6	Shut-off ball valve
7	Electronic controller

8.5 Installation

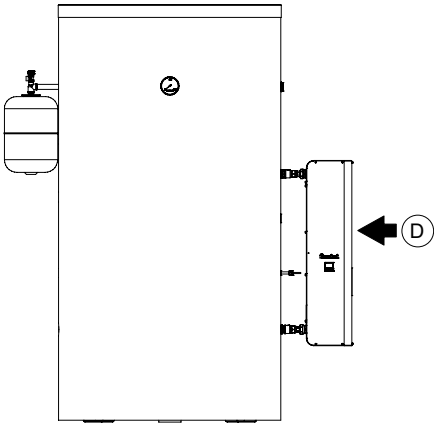
- Install the fittings and valves with sliding nuts **A** on the tank.
- Install housing **B** on the tank.



- Check the centre-to-centre distance of the connections and adjust based on the kit, if necessary.
- Connect kit **C** to the tank using the sliding nuts on the valves.



- Connect the pump cable.
- Install cover **D**.



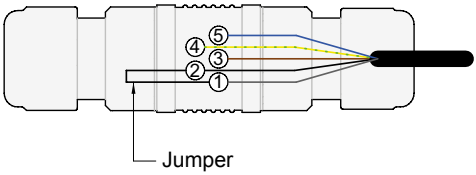
- Make the connections to the delivery and return pipes (see *"Installation diagram"*) so that:
  - no weight or strain is placed on the on the product;
  - heat exchanger, circulation pump and any other parts are easily accessible for inspection and dismantling (see *"Installation site"*);
  - tightness of the fluid under pressure in the storage unit is guaranteed.
- Install a safety valve for the domestic water circuit. Ensure the valve has a suitable orifice diameter and its relieving pressure does not exceed the rated pressure of the components installed, in accordance with Directive 2014/68/EU.
- Install an expansion tank for the domestic water circuit in accordance with Directive 2014/68/EU. The capacity of the expansion tank shall be adequate for the volume and temperature of the system in order to provide protection against overpressure.
- Install a safety valve for the primary circuit. Ensure the valve has a suitable orifice diameter and its relieving pressure does not exceed the rated pressure of the components installed, in accordance with Directive 2014/68/EU.
- Install an expansion tank for the primary circuit in accordance with Directive 2014/68/EU. The capacity of the expansion tank shall be adequate for the volume and temperature of the system in order to provide protection against overpressure.
- All electrical connections must be carried out by qualified personnel only in accordance with local regulations and following the instructions of the pump's manufacturer.
- Envisage the possibility of draining the tank by preventing vacuum from forming using, for instance, a suitable anti-vacuum valve.
- **Connect the metal mass of the tank to the sacrificial anode supplied using the special connector, if present.**
- **Connect the metal mass of the tank to the grounding system.**
- **Check the water hardness which shall not be below 15°f and above 35°f (French degrees).**
- Connection of the kit to the mains supply must be made by the installer.
- Provide an external thermal protection for the fast heater.
- Ensure that voltage and frequency of the mains electricity match the values given on the data plate.
- From an electrical point of view, an alternating current motor with electronic controller behaves like a capacitor: when it is supplied with power, the power it absorbs is as high as an inrush current and can reach values of up to 10.3 A.
- Connect the kit to the power supply using the cable provided, open the joint and use the following terminals:

  5 - Neutral

  4 - Earth

  3 - Phase

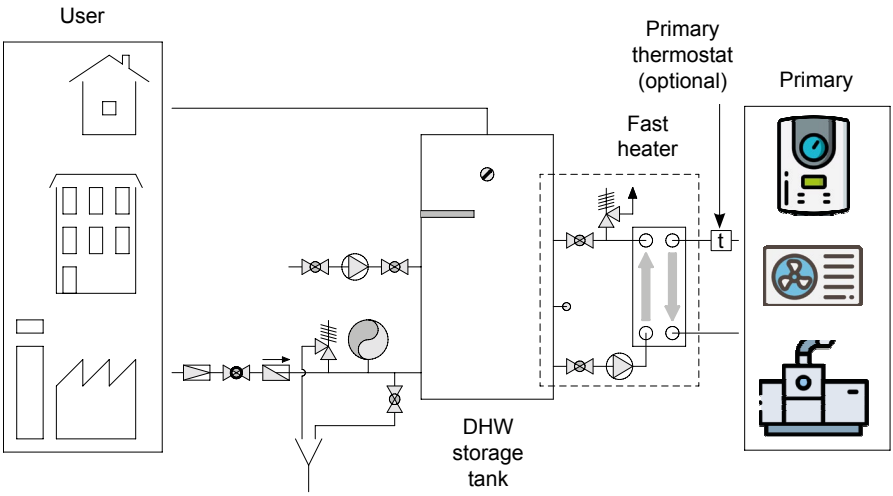
  - The jumper 2-1 must be removed to connect the primary thermostat and/ or remote start; it must be left on in all other cases.



- The kit has an electronic controller with thermostat function. The thermostat checks the temperature of the storage tank by means of a PT100 probe.

- The thermostat has three different setpoints corresponding to:
  - C1.SE - storage tank setpoint,
  - C2.SE - anti-legionella cycle setpoint, and
  - A1.SE - deviation to C1 (always 0).
- The setpoint indicates the temperature the storage tank should reach to stop hot water demand and the circulation pump.
- Demand is restored when the temperature of the storage tank drops below the setpoint value - hysteresis (C1.SE - C.HYS and C1.SE - A1.SE - A1.HY). The two hysteresis should be set to the same value.

Refer to the controller's manual for information on how to change the setpoint value – hysteresis.



8.6 Anti-legionella cycle

Setpoint C2.SE is activated by closing the "anti-legionella setpoint activation" contact (terminals 6-7, see par. 12.2).

The closing time of the contact shall be adjusted by the person in charge of the legionella treatment which shall make sure it is enough to allow to reach a temperature of 65 °C for at least 15 minutes.

8.7 Putting into service

For a correct operation, the following is recommended:

- Installation in the water circuit and primary circuit of a pressure relief valve and an expansion tank of appropriate characteristics.
- Connection of the metal mass of the tank to the sacrificial anode.
- Check of the tap water hardness (**warranty is void if water hardness is below 15 °f or above 35 °f**).

Make sure the pressure does not exceed the operating pressure of the tank under no circumstances.

Prevent the temperature in the storage tank from exceeding 65 °C for a long time to increase savings in energy and reduce electrolysis and galvanic corrosion and scale deposits.

The temperature indicated above may be temporarily exceeded during the legionella treatment envisaged by current health regulations for domestic hot water storage vessels.
Under no circumstances shall the temperature exceed the maximum allowed value for the tank and other parts of the circuit and, in all cases, it shall remain below the maximum value of 95 °C.

If necessary, take measures to avoid that domestic water can reach the point of use with a temperature that can cause inconvenience or damage.

8.8 Primary thermostat

It is possible to install a thermostat on the primary flow pipe to ensure that the Aquafast pump starts only when the water is at the right temperature.
The thermostat must close the contact when the temperature is higher than the set value.
The thermostat contact must be connected in place of the jumper on terminals ref. 2-1 (see page 38).

8.9 Remote start

It is possible to start Aquafast remotely (only if the storage temperature is below the set setpoint) by eliminating the jumper on terminals ref. 2-1 (see page 38) and connecting the start contact in its place.

It is possible to combine the primary thermostat and the remote start by connecting the contacts in series.

9. Maintenance

For a proper operation, the following guidelines should be observed:

- Check the sacrificial anode on a routine basis (the first check must be carried out within 6 months from installation); replace the sacrificial anode when signs of wear become apparent and, in any case, every year.
- Check operation of the system's pressure relief valve on a routine basis.
- Check the pre-charge of the expansion tanks on a routine basis.
- Check for leaks on a routine basis.
- Clean the domestic water side of the heat exchanger on a routine basis using appropriate products on sale. Follow the instructions and safety warnings provided and inspect the gasketed plates. In any case, always observe the instructions provided in the heat exchanger manual.
- Carry out a Legionella treatment (L.G.A. 2000 - "Guidelines for the prevention and control of Legionnaire's disease", Official Gazette no.103/2000) on a routine basis.

10. Disposal

When the appliance comes to the end of its life cycle, its parts should be disposed of properly. Contact companies specialised in this field which are able to dispose of them in compliance with current legislation.

11. Troubleshooting

Problem	Cause	Solution
Water in storage tank does not reach the required temperature	Thermostat set to a wrong temperature	Adjust the thermostat to the required temperature. NOTE: do not at any times exceed the temperature printed on the data plate.
	Thermostat defective	Replace with an equivalent model.
	Thermostat wrongly connected	Check connection following the instructions in the relevant manual.
	Primary circuit parts defective	Check the parts of the primary circuit.
	Domestic water pump defective	Follow the instructions provided in the pump's manual.
	Heat exchanger dirty	Clean following the instructions in the relevant manual.
Not enough domestic hot water	Storage temperature too low	Increase the temperature using the thermostat. NOTE: do not at any times exceed the temperature printed on the data plate.
	Low power of the primary circuit	Check operation and dimensioning of the parts of the primary circuit, i.e., pumps, valves, pipes and heat generating units.
	Wrong connection between primary circuit and heat exchanger	Connect following the diagram on page 12-13.
	Heat exchanger dirty	Clean following the instructions in the relevant manual.
	Water intake higher than the capacity of the water heater	Replace the unit following the instructions of our qualified personnel.

Problem	Cause	Solution
Temperature is too high	Thermostat set to a wrong temperature	Adjust the thermostat to the required temperature. NOTE: do not at any times exceed the temperature printed on the data plate.
	Thermostat wrongly connected	Check connection following the instructions in the relevant manual.
	Thermostat defective	Replace with an equivalent model.
	Primary circuit defective	Check the primary circuit.
Water leaks	Pipes are wrongly connected	Re-connect properly.
	The heat exchanger is leaking	See heat exchanger's manual.
Fouling of the heat exchanger	Water too hard	Install a water softener by following the installation instructions.
	Temperature in the primary circuit too high	Reduce temperature in the primary circuit. If necessary, fit a mixing valve to the primary circuit.

If problems other than the ones indicated in this chapter are found, contact the Service Centre or the Manufacturer.

12. Electronic controller



§ Setting of parameters

- Press key F while holding key SET C/A SET down to display the first menu, then release both keys.
- Press key F to go to the next menu.

List of menus

Con.o.	Relay 1 configuration
AL 1.o.	Relay 2 - Alarm 1 configuration
AL2.o.	Relay 2 - Alarm 2 configuration
ConF.	Device configuration
S.tun.	Self-tune, not used
SECU.	Security

- Press keys ▲ and ▼ to scroll through the parameter menu.
- Hold key SET C/A SET down and change the value of the selected parameter with keys ▲ and ▼.
- Press key F while holding key SET C/A SET down to quit the “Programming” mode or wait 20 seconds to exit automatically.

To change the menu values, you shall set the item you wish to change in field P.YES of the security menu.

§ Setting the setpoints



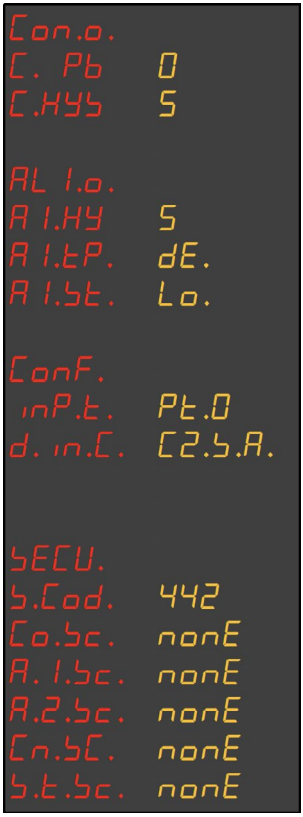
- Press SET c/A SET to display the first setpoint.
- Press key SET c/A SET once again to go to the next setpoint.

List of setpoints

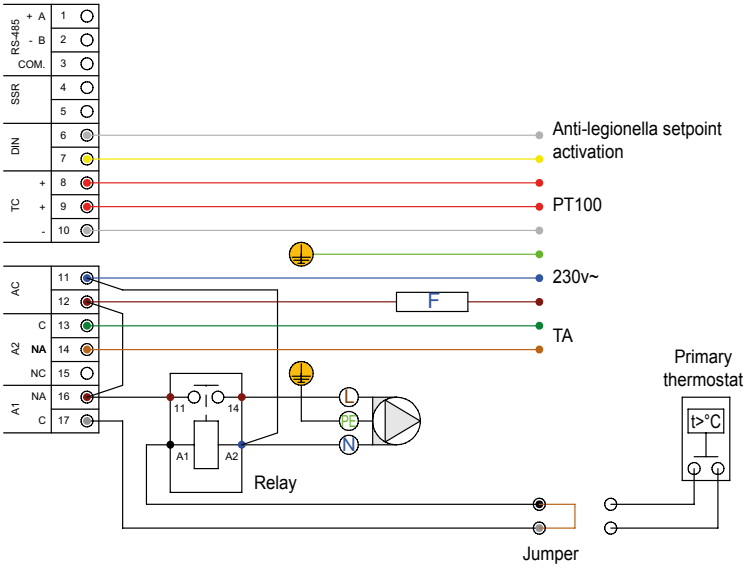
C 1.SE.	Main setpoint
C2.SE.	Anti-legionella cycle setpoint
A 1.SE.	Relay 2 differential, always set to 0

- Press keys ▲ and ▼ to change the displayed setpoint.
- Wait 3 seconds to exit the “Setpoint setting” mode.

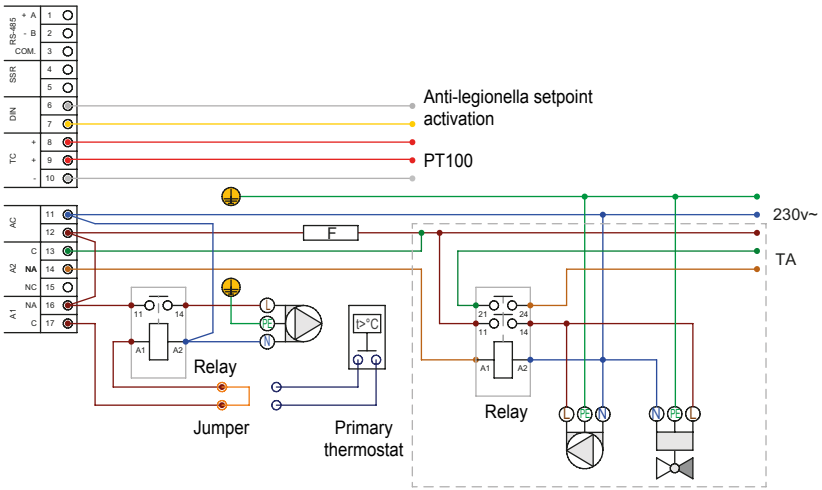
12.1 Controller settings



12.2 Terminal block wiring diagram



12.3 “Extended” terminal block wiring diagram



13. ModBUS

The controller is equipped with a communication port via ModBus RTU protocol of the RS485 type. The ModBus cable must be connected to pins 1 (A) 2 (B) and 3 (COM).
The default communication parameters are: ID = 1, Baud = 9600, 8 Bit, No parity, 1 Bit stop.

13.1 Memory Map for Holding Registers

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
Control Output Parameters	H0	0000d	(0000h)	Word	Control output, temperature setpoint value	Read / Write	400
	H1	0001d	(0001h)	Word	Control output, 2nd temperature setpoint value	Read / Write	400
	H2	0002d	(0002h)	Word	Control output, minimum setpoint value	Read / Write	0
	H3	0003d	(0003h)	Word	Control output, maximum setpoint value	Read / Write	600
	H4	0004d	(0004h)	Word	Control output, proportional band setpoint value (Adjustable between %0.0 and %100.0)	Read / Write	4
	H5	0005d	(0005h)	Word	Control output, hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H6	0006d	(0006h)	Word	Control output, integral time (Adjustable between 0.1 and 100.0 minute)	Read / Write	40
	H7	0007d	(0007h)	Word	Control output, derivative time (Adjustable between 0.01 and 10.00 minute)	Read / Write	100
	H8	0008d	(0008h)	Word	Control output, time period setpoint value (Adjustable between 1 and 125 second)	Read / Write	20
	H9	0009d	(0009h)	Word	Control output, set value power ratio (Adjustable between %0 and % 100)	Read / Write	0
	H10	0010d	(000Ah)	Word	Control output, set value power ratio in case of sensor failure (Adjustable between %0 and %100)	Read / Write	0
	H11	0011d	(000Bh)	Word	Control output, soft start value	Read / Write	0
A1 Output Parameters	H12	0012d	(000Ch)	Word	Alarm1 output temperature setpoint value	Read / Write	500
	H13	0013d	(000Dh)	Word	Alarm1 output minimum setpoint value limit	Read / Write	0
	H14	0014d	(000Eh)	Word	Alarm1 output maximum setpoint value limit	Read / Write	600
	H15	0015d	(000Fh)	Word	Alarm1 output proportional band set value (Adjustable between %0.0 and %100.0)	Read / Write	0
	H16	0016d	(0010h)	Word	Alarm1 output hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H17	0017d	(0011h)	Word	Alarm1 output, integral time (Adjustable between 0.1 and 100.0 minute)	Read / Write	0
	H18	0018d	(0012h)	Word	Alarm1 output, derivative time (Adjustable between 0.01 and 10.00 minute)	Read / Write	0
	H19	0019d	(0013h)	Word	Alarm1 output, time period setpoint value (Adjustable between 1 and 125 second)	Read / Write	20

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
A1 Output Parameters	**H20**	0020d	(0014h)	Word	Alarm 1 output, set value power ratio (Adjustable between %0 and % 100)	Read / Write	0
	H21	0021d	(0015h)	Word	Alarm1 output, set value power ratio in case of sensor failure (Adjustable between %0 and %100)	Read / Write	0
	H22	0022d	(0016h)	Word	Alarm1 output type selection (Values can be given from O to 4) (0 = Independent alarm, 1 = Deviation alarm, 2 = Band alarm, 3 = Active alarm after in band time, 4 = Alarm1 output, cooling control selection)	Read / Write	0
A2 Output Parameters	**H23**	0023d	(0017h)	Word	Alarm2 output, temperature setpoint value	Read / Write	500
	H24	0024d	(0018h)	Word	Alarm2 output minimum setpoint value limit	Read / Write	0
	H25	0025d	(0019h)	Word	Alarm2 output maximum setpoint value limit	Read / Write	600
	H26	0026d	(001Ah)	Word	Alarm2 output, hysteresis value (Adjustable between 1 and 50 °C or °F)	Read / Write	2
	H27	0027d	(001Bh)	Word	Alarm2 output type selection (Values can be given from O to 3) (0 = Independent alarm, 1 = Deviation alarm, 2 = Band alarm, 3 = Active alarm after in band time)	Read / Write	0
Configuration Parameters	**H28**	0028d	(001Ch)	Word	Input selection number (0 = PT100 Decimal, 1 = Pt100 Non-decimal, 2 = J Decimal, 3 = J Non-decimal, 4 = K Decimal, 5 = K Non-decimal, 6 = L Decimal, 7 = L Non-decimal, 8 = T Decimal, 9 = T Non-decimal, 1 0= S Non-decimal, 11 = R Non-decimal	Read / Write	5
	H29	0029d	(001Dh)	Word	ModBus device address (Adjustable between 1 and 247)	Read / Write	1
	H30	0030d	(001Eh)	Word	Modbus communication speed (Baudrate) (0 = Modbus cancel, 1 = 2400 bps, 2 = 4800 bps, 3 = 9600 bps, 4 =19200 bps, 5 = 38400 bps)	Read / Write	3
	H31	0031d	(001Fh)	Word	Digital filter coefficient (Adjustable between 1 and 200, 1 = filter is disable)	Read / Write	10
	H32	0032d	(0020h)	Word	Control output, selection value (0 = C/A2 Control output selection, 1 = SSR Output)	Read / Write	0
	H33	0033d	(0021h)	Word	Reserved	Read / Write	XX
	H34	0034d	(0022h)	Word	Reserved	Read / Write	XX
	H35	0035d	(0023h)	Word	Offset value	Read / Write	0
	H36	0036d	(0024h)	Word	Function control parameter. (23040d (5A00h) self tune stops when this value is entered) (23041d (5A01h) self tune starts when this value is entered) (23042d (5A02h6) returns to factory defaults when this value is entered)	Read / Write	0

	Par. Nr	Holding Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission	Factory Defaults
Configuration Parameters	**H37**	0037d	(0025h)	Word	Reserved	Read / Write	XX
	H38	0038d	(0026h)	Word	Reserved	Read / Write	XX
	H39	0039d	(0027h)	Word	Manual control output percentage (Adjustable between %0 and % 100)	Read / Write	50
	H40	0040d	(0028h)	Word	Digital input control parameter (O = Digital input off, 1 = 2nd set value is selected with digital input, 2 = Manual mode is entered via digital input, 3 = Digital input is passed to display mode	Read / Write	0
	H41	0041d	(0029h)	Word	Functionk ey controlp arameter(0 = Function key off, 1 = 2nd Set value is selected with function key, 2 = Manual mode is entered via function key, 3 = With the function key display mode is entered)	Read / Write	0
	H42	0042d	(002Ah)	Word	Reserved	Read / Write	XX
	H43	0043d	(002Bh)	Word	Reserved	Read / Write	XX
	H44	0044d	(002Ch)	Word	Reserved	Read / Write	XX
	H45	0045d	(002Dh)	Word	Reserved	Read / Write	XX
	H46	0046d	(002Eh)	Word	Reserved	Read / Write	XX
	H47	0047d	(002Fh)	Word	Reserved	Read / Write	XX
	H48	0048d	(0030h)	Word	Control output menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H49	0049d	(0031h)	Word	Alarm1 output menu security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H50	0050d	(0032h)	Word	Alarm2 output menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H51	0051d	(0033h)	Word	Configuration menu, security parameter (0 = Menu invisible, 1 = Menu programmable, 2 = Menu only visible)	Read / Write	1
	H52	0052d	(0034h)	Word	Self tune menu, security parameter (0 = Menu invisible, 1 = Self tune can be done)	Read / Write	1

13.2 Memory Map of Coils

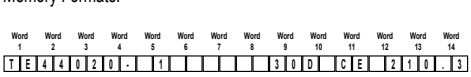
Par. Nr	Coil Adresses	Data type	Data Content	Read Write Permission	Factory Defaults
C0	(0000)h	Bit	Alarm2 Status (0 = Active Low, 1 =Active High)	Read / Write	1
C1	(0001)h	Bit	Alarm2 output position in case of Prob failure (0 = Off, 1 = On)	Read / Write	0
C2	(0002)h	Bit	Alarm1 Status (0 = Active Low, 1 =Active High)	Read / Write	1
C3	(0003)h	Bit	Alarm1 output position in case of Prob failure (0 = Off, 1 = On)	Read / Write	0
C4	(0004)h	Bit	Control output configuration (0 = Heat ; 1 = Cool)	Read / Write	0

Par. Nr	Coil Adresses	Data type	Data Content	Read Write Permission	Factory Defaults
C5	(0005)h	Bit	Temperature unit (0 = °C ; 1 = °F)	Read / Write	0
C6	(0006)h	Bit	Control outputs active (0 = Control outputs active, 1 = Only display mode)	Read / Write	0
C7	(0007)h	Bit	Controlling according to 2nd temperature setpoint (If C7 = 0 is H0, if C7 = 1 is H1)	Read / Write	0
C8	(0008)h	Bit	Auto/Manual selection (0 = Automatic "Running mode", 1 = Manual "Running mode". In this mode, output generated according to H39 parameter)	Read / Write	0
C9	(0009)h	Bit	Control fonmat in case of probe failure (0 = H 10 proportional control according to percentage value, 1 = Error found before the setpoint control is done with the value of the proportional control	Read / Write	0

13.3 Memory Map for Input Registers

Par. Nr	Input Register Adresses Desimal	(Hex)	Data type	Data Content	Read Write Permission
I0	0000d	(0000h)	Word	Measured temperature	Read Only
I1	0001d	(0001h)	Word	Percentage of analog output	Read Only
I2	0002d	(0002h)	Word	Measurement error codes 0 = No error, 1 = Sensor disconnected or broken, 2 = Lower scale error, 3 = Upper scale error, 4 = PT100 short circuit or temperature too low, 5 = Wrong input selection	Read Only
I3	0003d	(0003h)	Word	Self tune condition codes 0 = No error, 1 = Initial temperature is higher than 60% setpoint value, 2 = Calculating PIO parameters, 3 = Calculating power set parameters	Read Only
I4	0004d	(0004h)	Word	Current (active) temperature setpoint	Read Only
I5	0005d	(0005h)	Word	Reserved	Read Only
I6	0006d	(0006h)	Word	Current (active) decimal point value (0 = No decimal point, 1 = 0.0 Decimal point is tenths	Read Only

13.4 Memory Map for Software Revision Input Registers

Software Revision	61472d (F020h)	14 Word	Software name and update is read in ASCII format and as 14 word. Sample: ET4420-01 03 Dec 2013. Memory Formats:  **Note: To view each word correctly by changing the byte sequences should be displayed as ASCII TEXT**	Read Only

13.5 Memory Map for Discrete Input

Par. Nr	Discrete Input Adresses	Data type	Data Content	Read Write Permission
D0	(0000)h	Bit	C/A2. Control output status (0 = OFF , 1 = ON)	Read Only
D1	(0001)h	Bit	A1 Output status (0 = OFF , 1 = ON)	Read Only
D2	(0002)h	Bit	SSR Output status (0 = OFF , 1 = ON)	Read Only
D3	(0003)h	Bit	Digital input status (0 = OFF , 1 = ON)	Read Only

13.6 ModBUS error messages

Mod bus protocol has two types error, communication error and operating error. Reason of the communication error is data corruption in transmission. Parity and CRC control should be done to prevent communication error. Receiver side checks parity and CRC of the data. If they are wrong, the message will be ignored. If format of the data is true but function doesn't perform for any reason, operating error occurs. Slave realizes error and sends error message. Most significant bit of function is changed '1' to indicate error in error message by slave. Error code is sent in data section. Master realizes error type via this message.

ModBUS Error Codes

Error Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the slave.
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the slave.

Message example:

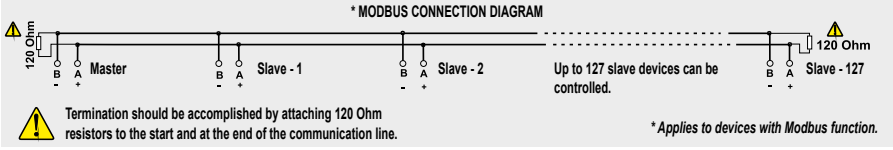
Structure of command message (Byte format)

Device Addess		(0A)h
Function Code		(01)h
Beginning address of coils	MSB	(04)h
	LSB	(A1)h
Number of coils (N)	MSB	(00)h
	LSB	(01)h
CRC DATA	MSB	(AC)h
	LSB	(63)h

Structure of response message (Byte format)

Device Addess		(0A)h
Function Code		(81)h
Error Code		(02)h
CRC DATA	MSB	(B0)h
	LSB	(53)h

As you see in command message, coil information of (4A 1)h = 1185 is required but there isn't any coil with 1185 address. Therefore error code with number (02) (Illegal Data Address) sends.





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