DConnect BOX KIT Modbus

Manuale di Istruzioni ed Uso

1. Introduzione

Questo manuale ha lo scopo di illustrare il corretto utilizzo dell'interfaccia MODBUS per BMS da applicare al dispositivo DConnect Box.

L'interfaccia aggiuntiva (60198693 - KIT adattatore DConnect BMS Modbus RTU RS485) permette di inserire all'interno di un sistema di supervisione MODBUS RTU tutte le pompe elettroniche e i quadri elettrici associabili al DConnect.

Questo manuale è rivolto a utenti aventi familiarità con i dispositivi Modbus. Il lettore dovrà possedere conoscenze base di tale protocollo e delle specifiche tecniche.

Si assume inoltre che sia già presente una rete Modbus RTU con un dispositivo "master".

1.1. Abbreviazioni e definizioni

BMS	Building Management System
DConnect	Sistema DAB per il controllo remoto delle pompe tramite cloud, via internet.
CRC	Cyclic Redundancy Check
RTU	Remote Terminal Unit
0x	Prefisso che identifica un numero esadecimale

1.2. Specifiche Modbus

Specifiche Modbus	Descrizione	Note
Protocollo	Modbus RTU	È supportata solo la modalità "Slave"
Connessioni	Morsettiera	
Interfaccia fisica	RS485	
Indirizzo slave	Da 1 (default) a 247	
Velocità supportata	4800, 9600, 19200	
Start bit	1	
Data bit	8	
Stop bit	1	
Parità	None/nessuna	
Sample Rate	< 1 minuto in lettura, < 2 secondi in scrittura	

1.3. Tipologia Rete Modbus

Il grafico seguente fornisce una rappresentazione grafica della tipologia di rete da realizzare tramite DConnect + BMS.
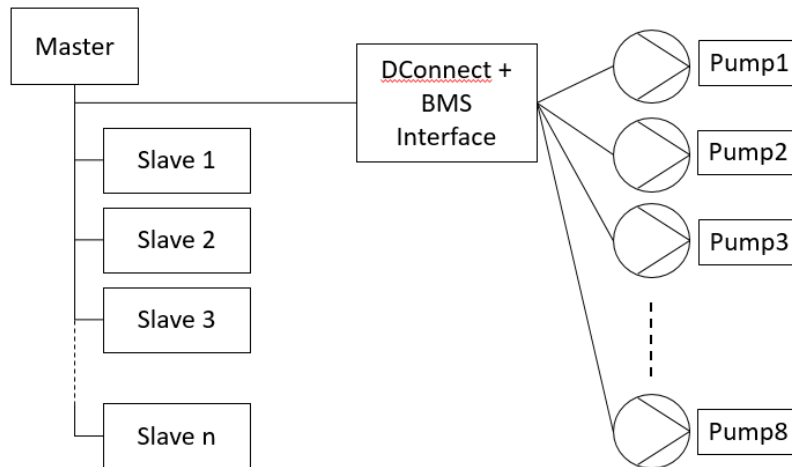
Il DConnect Box accessoriato con il dispositivo aggiuntivo per MODBUS RTU, rappresenta l'interfaccia fra le pompe e il supervisore BMS: raccoglie le informazioni delle Pompe elettroniche DAB elencate nel paragrafo 3.6 Product Type e le espone in un solo oggetto interrogabile da una centralina tramite Modbus RS485 RTU.

2. Configurazione Modbus

2.1. Aggiornamento DConnect Box

L'utilizzo dell'interfaccia Modbus RTU opzionale prevede **l'aggiornamento software del DConnect Box**. Per fare questo assicurarsi che sia presente una connessione ad Internet tramite Ethernet o WiFi. Si rimanda al sito internet https://internetofpumps.com per maggiori dettagli sull'installazione e sull'utilizzo del DConnect Box.

2.2. Cablaggio

Collegare l'accessorio di interfaccia ad una qualsiasi porta USB del DConnect Box. Si rimanda al manuale del DConnect Box in merito al collegamento delle pompe.

Collegare l'accessorio di interfaccia Modbus con il controllore Modbus RTU come segue.

La comunicazione Modbus tramite RS485- 2 wire prevede l'utilizzo di 2 cavi, A e B più un eventuale GND per la schermatura (shield). E' consigliato l'utilizzo di un cavo con le seguenti caratteristiche:
Cavo suggerito per MODBUS RTU
Cavo twistato multicoppia 0,22 mm², 250 V, schermatura F/UTP, guaina in PVC.

Collegare il cavo rispettando la nomenclatura standard:
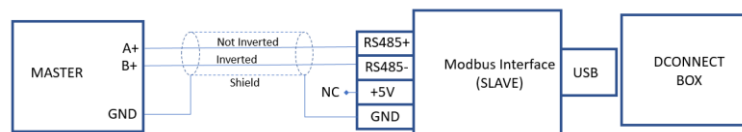
⚠️ Prima di operare assicurarsi di staccare la tensione dalla linea di alimentazione e di utilizzare solo i cavi e gli accessori consigliati.

3. Registri Modbus RTU

Le funzioni supportate sono mostrate nella tabella seguente:

Type	code	Hex	Name
	03	0x03	Read holding registers
16-bit data (registers)	06	0x06	Write input register
	16	0x10	Preset Multiple Registers

3.1. Tipo di messaggi Modbus

Di seguito vengono riportati i dettagli del messaggio Modbus utilizzato per il codice prodotto DAB in questione.

Gli offset da interrogare cambiano a seconda della famiglia di prodotto come indicato in tabella:

Family	Offset 0x
Active Driver Plus	0000
ADAC	1000
DConnect Box	2000
e.Box	3000
e.Syline	4000
MCE-P	5000

Si rimanda al paragrafo

3.2. Lettura Seriale Dispositivo

La lettura del seriale del dispositivo, utile in fase di identificazione del prodotto, viene effettuata tramite la Function Code 0x03 (Read Holding Register) a partire dal registro 0 di ogni famiglia di prodotto per 25 registri successivi.

Esempio: leggere il seriale di una e.sybox.

Indirizzo Slave	Function Code	Dati			Registri successivi	CRC
01	03		4000		0025	CRC
DConnectBox Address	Read holding register	Offset Family + Offset Position + Offset Parameter				
		0x4000 +	0x0000 +	0x0000		

3.3. Status

La tabella seguente elenca i registri Modbus RTU dei parametri della pompa (Function Code 0x03).

IMPORTANTE: la pompa restituisce valori corretti in conformità al sistema di misura selezionato (parametro "MS Measure System")

La scelta del sistema di misura tramite il parametro "MS Measure System" può essere effettuata anche in locale, sulla pompa stessa. E' auspicabile, quindi, che il sistema di misura venga impostato durante l'installazione del prodotto.

NOTA: fare riferimento ai manuali dei singoli prodotti per il significato dei parametri ed eventuali accessori necessari.

Offset	Parametro	Descrizione	Scala	Unità di misura	Tipo	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
1A	Product type	3.6 Product Type			R	●	●	●	●	
20	VP Pressure Bar		0.1	Bar	R	●	●	●	●	
21	VP Pressure Psi		1	Psi	R	●	●	●	●	
1C	SP Setpoint pressure Bar		0,1	Bar	R W	●	●	●	●	
1D	SP Setpoint pressure Psi		1	Psi	R W	●	●	●	●	
1E	RP Pressure fall to restart Bar		0,1	Bar	R W	●	●	●	●	
1F	RP Pressure fall to restart Psi		1	Psi	R W	●	●	●	●	
23	Pump status	0 StandBy 1 Go 2 Fault 3 Warning 4 Not configured 5 Function F1 6 Function F3 7 Function F4 8 Manual Disable 9 Startup 10 Stop manual menù 11 Go manual menù			R	●	●	●	●	
24	System status	3.5 System Status e Errori			R	●	●	●	●	
25	Latest error	3.5 System Status e Errori			R	●	●	●	●	
3A	P1 Aux1 setpoint Bar		0,1	Bar	R W	●	●	●		
3B	P1 Aux1 setpoint Psi		1	Psi	R W	●	●	●		
3C	P2 Aux2 setpoint Bar		0,1	Bar	R W	●	●	●		
3D	P2 Aux2 setpoint Psi		1	Psi	R W	●	●	●		
3E	P3 Aux3 setpoint Bar		0,1	Bar	R W	●	●	●		
3F	P3 Aux3 setpoint Psi		1	Psi	R W	●	●	●		
27	C1 Pump phase current		0,1	A	R	●	●	●		
28	PO Output power		0,001	kW	R	●	●	●		
29	HO Pump run hours		1	Hours	R	●	●	●		
40	I1 Input1 function	0 disabled / inactive 1 float NO / active 2 Float NC 3 P aux NO 4 P aux NC 5 Enable NO 6 Enable NC			R	●	●	●		●

Offset	Parametro	Descrizione	Scala	Unità di misura	Tipo	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
		7 En. NO reset 8 En. NC reset 9 Reset Fault 10 Low Press. NO 11 Low Press. NC 12 Low pr. NO MR 13 Low pr. NC MR								
41	I2 Input2 function	0 disabled / inactive 1 float NO / active 2 Float NC 3 P aux NO 4 P aux NC 5 Enable NO 6 Enable NC 7 En. NO reset 8 En. NC reset 9 Reset Fault 10 Low Press. NO 11 Low Press. NC 12 Low pr. NO MR 13 Low pr. NC MR			R	●	●	●		●
42	I3 Input3 function	0 inactive 1 active			R					●
43	I4 Input4 function	0 inactive 1 active			R					●
22	VF Flow	0 Absent 1 Present			R	●				
47	VF Flow Liter		1	liters /min	R			●		
48	VF Flow Gall		1	gall/min	R			●		
2C	Pump1	0 pump enable 1 pump disable			R				●	
2D	P1 Output power		0,001	kW	R				●	
2E	P1 Hours ON		1	hours	R				●	
2F	P1 Phase current		0,1	A	R				●	
31	Pump2	0 pump enable 1 pump disable			R				●	
32	P2 Output power		0,001	kW	R				●	
33	P2 Hours ON		1	hours	R				●	
34	P2 Phase current		0,1	A	R				●	
4A	Max Level	0 inactive 1 active			R				●	
4B	High Level	0 inactive 1 active			R				●	
4C	Medium Level	0 inactive 1 active			R				●	
4D	Low Level	0 inactive 1 active			R				●	

Offset	Parametro	Descrizione	Scala	Unità di misura	Tipo	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
4E	Min Level	0 inactive 1 active			R				●	
4F	Max press	0 inactive 1 active			R				●	
50	High press	0 inactive 1 active			R				●	
51	Low press	0 inactive 1 active			R				●	
52	Min press	0 inactive 1 active			R				●	

Note: R = Read / Parametro in lettura

W = Write / Parametro in scrittura

R W = Read and Write / Parametro in lettura o scrittura

3.4. Comandi

La tabella seguente elenca i registri Modbus RTU relativi ai "comandi" (Function Code 0x06).

Offset	Parametro	Descrizione	Scala	Unità di misura	Tipo	Active Driver	ADAC-MCE	e.Syline	e.Box	DConnect Box
2B	Identify device (*)	1 Identify			W	●	●	●	●	●
1B	MS Measure system	0 International 1 Anglo-American			W	●	●	●	●	
1C	SP Setpoint pressure Bar		0,1	Bar	R W	●	●	●	●	
1D	SP Setpoint pressure Psi		1	Psi	R W	●	●	●	●	
1E	RP Pressure fall to restart Bar		0,1	Bar	R W	●	●	●	●	
1F	RP Pressure fall to restart Psi		1	Psi	R W	●	●	●	●	
26	Reset actual fault	1 Reset Actual Fault			W	●	●	●	●	
3A	P1 Aux1 Setpoint Bar		0,1	Bar	R W	●	●	●		
3B	P1 Aux1 SetpointPsi		1	Psi	R W	●	●	●		
3C	P2 Aux2 Setpoint Bar		0,1	Bar	R W	●	●	●		
3D	P2 Aux2 Setpoint Psi		1	Psi	R W	●	●	●		
3E	P3 Aux3 Setpoint Bar		0,1	Bar	R W	●	●	●		
3F	P3 Aux3 Setpoint Psi		1	Psi	R W	●	●	●		
44	O1 Output1 function	0 Disabled NC 1 Enabled NC 2 Fault NO 3 Fault NC			R W	●	●	●		●
45	O2 Output2 function	0 Disabled NC 1 Enabled NC 2 Run NO 3 Run NC			R W	●	●	●		●
49	e.sybox enable/disable	1 Enable 2 Disable			R W			●		
30	e.box pump1 enable/disable	0 disable, error 1 enable			R W				●	
35	e.box pump2 enable/disable	0 disable, error 1 enable			R W				●	
60	Set ID Address (**)	1-247 (1 default)			W					●
61	Set BMS Baudrate (**)	2 4800 bps 3 9600 bps 4 19200 bps			W					●

| Offset	Parametro	Descrizione	Scala	Unità di misura	Tipo	Active Driver	ADAC-MCE	e.Syline	e.Box	DConnect Box
2C	Dconnect box reboot	0 reset solo micro 1 reset DConnect Box			W					●

(*) tale comando identifica fisicamente l'apparato tramite lampeggio del display o suoni acustici nel caso del DConnect Box.

(**) tali comandi vanno eseguiti in successione affinché vengano attuati.

3.4.1. Modifica parametri da WebAPP

Per configurare il sistema in modo più intuitivo, semplice e veloce è possibile sfruttare la webAPP del DConnect, già utilizzata per l'aggiornamento del DConnect Box.

Per modificare i parametri tramite protocollo Modbus vedi l'esempio riportato nel paragrafo 3.8.1 (Cambio Configurazione DConnect Box).
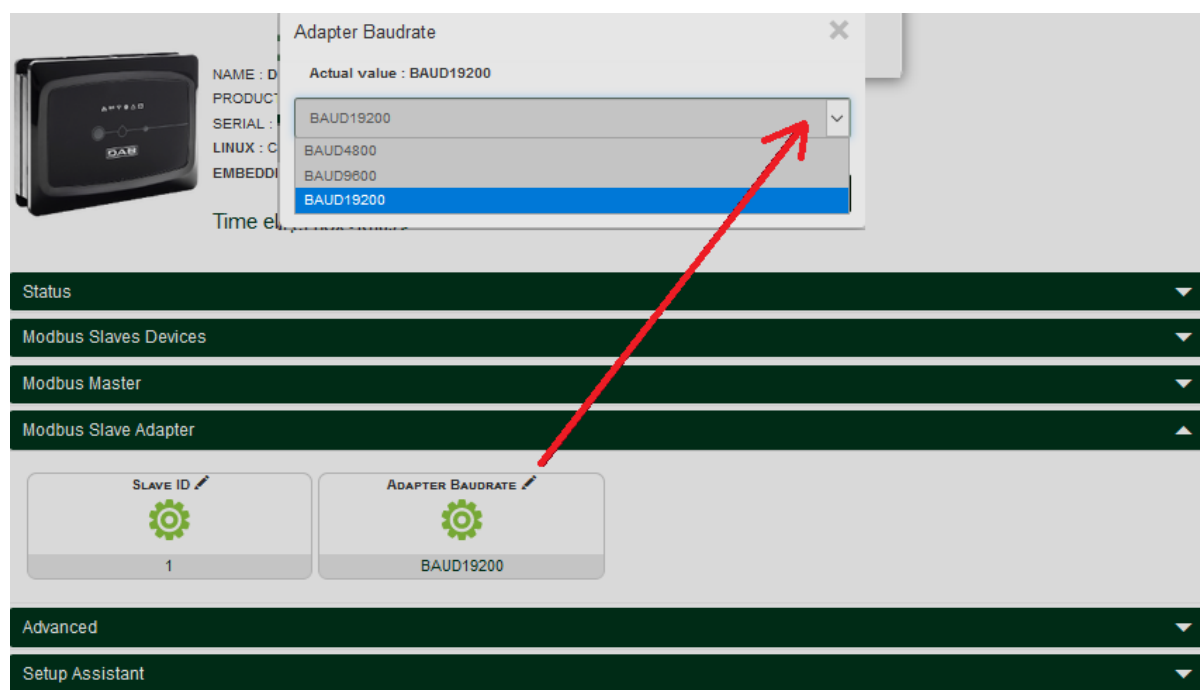
3.5. System Status e Errori

Errors	Active Driver Plus	ADAC MCE-P	e.Syline	e.Box	Type
Shot circuit HV	18,19,20	18,19,20	18,19	13,83,84	error
Voltage error	21,23,24,25,26,27,38	21,23,24,25,26,27	25,27,28,29,30,31	17,18,19,	error
Overload input	28,29,30	28,29,30	32,33,		error
Operation mode change				10	error
Keys error				12	error
V Selector error				14	error
Relay/contactor alarm				25,79,80	error
Not configured				32	error
Too high start frequency				35,85,86	error

Errors	Active Driver Plus	ADAC MCE-P	e.Syline	e.Box	Type
Locked pump				59,87,88	error
Inconsistent fl. sw. status				70	error
Inconsistent lvl prb. status				71	error
Incons. pressostats status				72	error
Depth sensor				74	error
Internal error	1-16,17,22	1-16,17	1-16,17,20, 21,22,23,24,26	1-16,20,21,29, 38,39,50, 51,54,55,63	error

Warnings	Active Driver Plus	ADAC MCE-P	e.Syline	e.Box	Type
Over temperature	33,34,35,36,37	33,34,35,36,37	35,36,37,38		warning
Low voltage LP	39	38	39,40,	23	warning
High voltage HP	40	39	41	24	warning
Over current	41,42	40,41	42,43	26,75,76	warning
Input voltage				22	warning
Dry run	45	47	49	34,81,82	warning
Hot pump PH	48	46	46		warning
Over power OP			44		warning
Pressure sensor BP	49, 50,51	48,49,50	50,51,52,	73	warning
Anti-cycling AY	56		57	53,89,90	warning
Pump oscillation PO		55			warning
Plant error WP		56			warning
Disconnected pump			53	27,77,78	warning
Fluid hot HL			54		warning
Over pressure			55	37	warning
Loss LK			56		warning
Min level				41,44	warning
Max level				42, 45	warning
Max pressure pressostat				64	warning
Min level float switch				65	warning
Min level probe				66	warning
Max level float switch				67	warning
Max level probe				68	warning
Min pressure pressostat				69	warning

3.6. Product Type

Le tabelle seguenti rappresentano i "product type" per le famiglie di prodotti.

Il "product type" può essere ottenuto con il registro offset 001A.

FAMILY	VALUE	PRODUCT TYPE
Active Driver Plus	41	M/M 1.1 kW 8.5 A
	42	M/M 1.5 kW 11.0 A

FAMILY	VALUE	PRODUCT TYPE
	43	M/M 1.8 kW 14.0 A
	44	T/T 5.5 kW 13.3 A
	45	T/T 3.0 kW 7.5 A
	46	M/T 2.2 kW 10.5 A
	47	M/T 1.0 kW 4.7 A
	48	T/T 5.5 kW 13.3 A
	49	T/T 3.0 kW 7.5 A
	50	M/T 2.2 kW 10.5 A
	51	M/T 1.0 kW 4.7 A
	52	M/M 1.8 kW 14.0 A
	53	M/M 1.5 kW 11.0 A
	54	M/M 1.1 kW 8.5 A
	11	ADAC T/T 15
	12	ADAC T/T 11
	13	ADAC T/T 7.5
	14	ADAC T/T 5.5
	15	ADAC T/T 4.0
	16	ADAC T/T 3.0
	17	ADAC M/T 2.2
	18	ADAC M/T 1.5
ADAC / MCE-P	19	ADAC M/T 1.0
	20	MCE-P 150
	21	MCE-P 110
	22	MCE-P 55
	23	MCE-P 30
	24	MCE-P 22
	25	MCE-P 15
	26	MCE-P 11
e.Syline	65	e.sybox 1.5 kW NP
e.Box	77	EBOX Basic D
e.Box	78	EBOX Plus D

3.7. Aggiunta di un nuovo prodotto e sostituzione

Ogni famiglia di prodotto può contenere virtualmente fino a 16 dispositivi. Una volta collegata al DConnect Box, una pompa riceverà un seriale univoco e occuperà la prima posizione libera delle 16 a disposizione. Tale posizione rimarrà occupata anche se la pompa verrà spenta o sostituita. Per riferire la pompa successiva della stessa famiglia presente nell'impianto occorrerà aggiungere un offset di 0x0100.

Esempio: Installazione composta da 3 MCE-P e un Active Driver Plus. Si suppone un guasto all'MCE-P in seconda posizione (offset 0x5100). Il nuovo MCE-P occuperà la prima posizione libera all'interno dei registri assegnati a quella famiglia, quindi avrà un offset di 0x5300.

N°	Famiglia	Offset originale		Sostituzione del MCE-P num 2
1	MCE-P	0x5000		0x5000
2	MCE-P	**0x5100**	**-> Sostituzione ->**	**0x5300**
3	MCE-P	0x5200		0x5200
4	Active Driver Plus	0x0000		0x0000

NOTA: il DConnect Box gestisce fino ad un massimo di 8 pompe ma in base alla complessità dell'installazione tale numero potrebbe variare. Si consiglia di contattare il Customer Service DAB per un numero di pompe elevato.

3.8. Esempi

3.8.1. Cambio Configurazione DConnect Box

Per permettere il corretto funzionamento all'interno di un sistema di supervisione, occorre impostare l'indirizzo dello slave (il DConnect Box) e la velocità della seriale.

Per evitare di perdere la comunicazione con il dispositivo, occorre scrivere i due registri in modo contiguo, utilizzando la Function Code 16 (Preset Multiple Registers).

Se l'operazione va a buon fine, un segnale acustico ("beep") verrà emesso dal DConnect Box. Vedi esempio seguente.

a. Configurare un DConnectBox all'indirizzo Modbus 100 con velocità 19200 bps:

Indirizzo Slave	Function Code	Offset					Value	CRC
01	10	2060					0064	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family 0x2000	+	Offset Position 0x0000	+	Offset Parameter 0x0060	100 HEX = 0x0064	
01	10	2061					4	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family 0x2000	+	Offset Position 0x0000	+	Offset Parameter 0x0061	4 = 19200	

* YYYY CRC16 calcolato.

b. Successivamente modificare la baudrate a 9600 bps.

Indirizzo Slave	Function Code	Offset					Value	CRC
64	10	2060					0064	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family 0x2000	+	Offset Position 0x0000	+	Offset Parameter 0x0060	100 HEX = 0x0064	
64	10	2061					3	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family 0x2000	+	Offset Position 0x0000	+	Offset Parameter 0x0061	3 = 9600	

* YYYY CRC16 calcolato.

3.8.2. Lettura parametri

Si consideri un impianto costituito da due ADAC e una e.sybox.

a. Richiesta della pressione in Bar del **primo ADAC**:

Indirizzo Slave	Function Code	Dati		CRC
01	03	1020		YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter 0x1000 + 0x0000 + 0x0020		

Nota: (MS_Measure System impostato come International)

b. Richiesta della pressione in Psi del **secondo ADAC**:

Indirizzo Slave	Function Code	Dati		CRC
01	03	1120		YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter 0x1000 + 0x0100 + 0x0020		

Nota: (MS_Measure System impostato come International)

c. Richiesta della potenza di uscita della **e.sybox** (scala 0.001kW):

Indirizzo Slave	Function Code	Dati		CRC
01	03	4028		YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter 0x4000 + 0x000 + 0x0028		

Nota: (MS_Measure System impostato come International)

* YYYY CRC16 calcolato.

3.8.3. Scrittura parametri

Si consideri lo stesso impianto costituito da due ADAC e una e.sybox.

a. Impostazione del setpoint di pressione in Bar del **secondo ADAC** al valore **3.3 Bar**:

Indirizzo Slave	Function Code	Offset			Value	CRC
01	06	111C			0021	YYYY *
DConnectBox Address	Write input registers	Offset Family + Offset Position + Offset Parameter 0x1000 + 0x0100 + 0x001C			3.3 / 0.1 = 33 HEX = 0x0021	

Nota: (MS_Measure System impostato come International)

* YYYY CRC16 calcolato.

DConnect BOX KIT Modbus

Instruction and User Manual

1. Introduction

The purpose of this manual is to illustrate the correct use of the MODBUS interface for BMS to be applied to the DConnect Box device.

The additional interface (60198693 - DConnect BMS Modbus RTU RS485 adapter kit) allows all the electronic pumps and electric panels associated with the DConnect to be included in a MODBUS RTU supervision system.

This manual is intended for users who are familiar with Modbus devices. The reader should have a basic knowledge of this protocol and of the technical specifications.

It is also assumed that there is already a Modbus RTU network with a "master" device.

### 1.1. Abbreviations and definitions

BMS	Building Management System
DConnect	DAB system for remote control of pumps via cloud, via Internet.
CRC	Cyclic Redundancy Check
RTU	Remote Terminal Unit
0x	Prefix identifying a hexadecimal number

1.2. Modbus specifications

Modbus specifications	Description	Notes
Protocol	Modbus RTU	Only "Slave" mode is supported
Connections	Terminal block	
Physical interface	RS485	
Slave address	From 1 (default) to 247	
Speed supported	4800, 9600, 19200	
Start bit	1	
Data bit	8	
Stop bit	1	
Parity	None	
Sample Rate	< 1 minute (reading), < 2 second (writing)	

1.3. Type of Modbus Network

The following graph provides a graphic representation of the type of network to be created using DConnect + BMS.
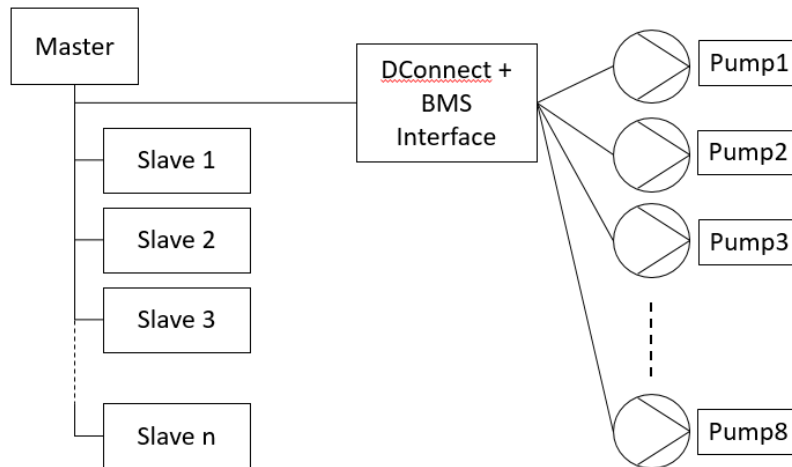
The DConnect Box, equipped with the additional device for MODBUS RTU, represents the interface between the pumps and the BMS supervisor: it collects the information of the DAB electronic pumps listed in paragraph 3.6 Product Type and displays it in a single object that can be queried by a control unit via Modbus RS485 RTU.

2. Modbus Configuration

2.1. Updating the DConnect Box

The use of the optional Modbus RTU interface requires a **software update of the DConnect Box**. To do this, make sure that there is an Internet connection via Ethernet or WiFi. See the Internet site https://internetofpumps.com for further details on the installation and use of the DConnect Box.

2.2. Wiring

Connect the interface accessory to any USB port on the DConnect Box. See the DConnect Box manual for the connection of the pumps.

Connect the Modbus interface accessory to the Modbus RTU controller as follows.

Modbus communication with 2-wire RS485 contemplates the use of 2 cables, A and B plus a possible GND for shielding. It is recommended to use a cable with the following characteristics:
Cable suggested for MODBUS RTU
Multipair twisted cable 0.22 mm², 250 V, F/UTP shielding, PVC sheath.

Connect the cable according to the standard nomenclature:
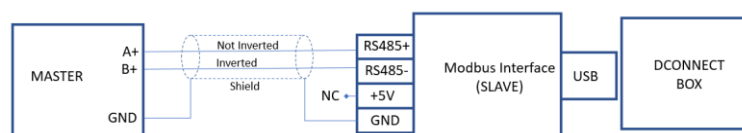
⚠️ Before starting work, disconnect the power from the supply line and use only the recommended cables and accessories.

3. Modbus RTU registers

The supported functions are shown in the following table:

Type	code	Hex	Name
	03	0x03	Read holding registers
16-bit data (registers)	06	0x06	Write input register
	16	0x10	Preset Multiple Registers

3.1. Type of Modbus messages

Below are the details of the Modbus message used for the DAB product code concerned.

The offsets to be queried change according to the product family as shown in the table:

Family	Offset 0x
Active Driver Plus	0000
ADAC	1000
DConnect Box	2000
e.Box	3000
e.Syline	4000
MCE-P	5000

See paragraph 3.8 Example

3.2. Reading device serial number

Reading the device serial number, useful during the product identification, is carried out by the Function Code 0x03 (Read Holding Register) starting from register 0 of each product family for 25 subsequent registers.

Example: read the serial number of an e.sybox.

Slave Address	Function Code	Data	subsequent registers	CRC
01	03	4000	0025	CRC
DConnectBox Address	Read holding register	Offset Family + Offset Position + Offset Parameter 0x4000 + 0x0000 + 0x0000		

3.3. Status

The following table lists the Modbus RTU registers of the pump parameters (Function Code 0x03).

IMPORTANT: The pump returns correct values according to the selected measuring system (parameter "MS Measure System").

The measurement system can also be selected locally using the "MS Measure System" parameter on the pump itself. It is therefore advisable to set up the measurement system during product installation.

NOTE: refer to the manuals of the individual products for the meaning of the parameters and any necessary accessories.

Offset	Parameter	Description	Scale	Measuring unit	Type	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
1A	Product type	3.6 Product Type			R	●	●	●	●	
20	VP Pressure Bar		0.1	Bar	R	●	●	●	●	
21	VP Pressure Psi		1	Psi	R	●	●	●	●	
1C	SP Setpoint pressure Bar		0,1	Bar	R W	●	●	●	●	
1D	SP Setpoint pressure Psi		1	Psi	R W	●	●	●	●	
1E	RP Pressure fall to restart Bar		0,1	Bar	R W	●	●	●	●	
1F	RP Pressure fall to restart Psi		1	Psi	R W	●	●	●	●	
23	Pump status	0 Standby 1 Go 2 Fault 3 Warning 4 Not configured 5 Function F1 6 Function F3 7 Function F4 8 Manual Disable 9 Startup 10 Stop manual menu 11 Go manual menu			R	●	●	●	●	
24	System status	3.5 System Status and Errors			R	●	●	●	●	
25	Latest error	3.5 System Status and Errors			R	●	●	●	●	
3A	P1 Aux1 setpoint Bar		0,1	Bar	R W	●	●	●		
3B	P1 Aux1 setpoint Psi		1	Psi	R W	●	●	●		
3C	P2 Aux2 setpoint Bar		0,1	Bar	R W	●	●	●		
3D	P2 Aux2 setpoint Psi		1	Psi	R W	●	●	●		
3E	P3 Aux3 setpoint Bar		0,1	Bar	R W	●	●	●		
3F	P3 Aux3 setpoint Psi		1	Psi	R W	●	●	●		
27	C1 Pump phase current		0,1	A	R	●	●	●		
28	PO Output power		0,001	kW	R	●	●	●		
29	HO Pump run hours		1	Hours	R	●	●	●		
40	I1 Input1 function	0 disabled / inactive 1 float NO / active 2 Float NC 3 P aux NO 4 P aux NC 5 Enable NO 6 Enable NC			R	●	●	●		●

Offset	Parameter	Description	Scale	Measuring unit	Type	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
		7 En. NO reset 8 En. NC reset 9 Reset Fault 10 Low Press. NO 11 Low Press. NC 12 Low pr. NO MR 13 Low pr. NC MR								
41	I2 Input2 function	0 disabled / inactive 1 float NO / active 2 Float NC 3 P aux NO 4 P aux NC 5 Enable NO 6 Enable NC 7 En. NO reset 8 En. NC reset 9 Reset Fault 10 Low Press. NO 11 Low Press. NC 12 Low pr. NO MR 13 Low pr. NC MR			R	●	●	●		●
42	I3 Input3 function	0 inactive 1 active			R					●
43	I4 Input4 function	0 inactive 1 active			R					●
22	VF Flow	0 Absent 1 Present			R	●				
47	VF Flow Liter		1	liters /min	R			●		
48	VF Flow Gall		1	gall/min	R			●		
2C	Pump1	0 pump enable 1 pump disable			R				●	
2D	P1 Output power		0,001	kW	R				●	
2E	P1 Hours ON		1	hours	R				●	
2F	P1 Phase current		0,1	A	R				●	
31	Pump2	0 pump enable 1 pump disable			R				●	
32	P2 Output power		0,001	kW	R				●	
33	P2 Hours ON		1	hours	R				●	
34	P2 Phase current		0,1	A	R				●	
4A	Max Level	0 inactive 1 active			R				●	
4B	High Level	0 inactive 1 active			R				●	
4C	Medium Level	0 inactive 1 active			R				●	
4D	Low Level	0 inactive 1 active			R				●	

Offset	Parameter	Description	Scale	Measuring unit	Type	Active Driver	ADAC-MCE	e.syline	e.box	DConnect Box
4E	Min Level	0 inactive 1 active			R				●	
4F	Max press	0 inactive 1 active			R				●	
50	High press	0 inactive 1 active			R				●	
51	Low press	0 inactive 1 active			R				●	
52	Min press	0 inactive 1 active			R				●	

Note: R = Read / Reading parameter
W = Write / Writing parameter
R W = Read and Write / Reading or writing parameter

3.4. Controls

The following table lists the Modbus RTU registers of the "controls" (Function Code 0x06).

Offset	Parameter	Description	Scale	Measuring unit	Type	Active Driver	ADAC-MCE	e.Syline	e.Box	DConnect Box
2B	Identify device (*)	1 Identify			W	●	●	●	●	●
1B	MS Measure system	0 International 1 Anglo-American			W	●	●	●	●	
1C	SP Setpoint pressure Bar		0,1	Bar	R W	●	●	●	●	
1D	SP Setpoint pressure Psi		1	Psi	R W	●	●	●	●	
1E	RP Pressure fall to restart Bar		0,1	Bar	R W	●	●	●	●	
1F	RP Pressure fall to restart Psi		1	Psi	R W	●	●	●	●	
26	Reset actual fault	1 Reset Actual Fault			W	●	●	●	●	
3A	P1 Aux1 Setpoint Bar		0,1	Bar	R W	●	●	●		
3B	P1 Aux1 SetpointPsi		1	Psi	R W	●	●	●		
3C	P2 Aux2 Setpoint Bar		0,1	Bar	R W	●	●	●		
3D	P2 Aux2 Setpoint Psi		1	Psi	R W	●	●	●		
3E	P3 Aux3 Setpoint Bar		0,1	Bar	R W	●	●	●		
3F	P3 Aux3 Setpoint Psi		1	Psi	R W	●	●	●		
44	O1 Output1 function	0 Disabled NC 1 Enabled NC 2 Fault NO 3 Fault NC			R W	●	●	●		●
45	O2 Output2 function	0 Disabled NC 1 Enabled NC 2 Run NO 3 Run NC			R W	●	●	●		●
49	e.sybox enable/disable	1 Enable 2 Disable			R W			●		
30	e.box pump1 enable/disable	0 disable, error 1 enable			R W				●	
35	e.box pump2 enable/disable	0 disable, error 1 enable			R W				●	
60	Set ID Address (**)	1-247 (1 default)			W					●
61	Set BMS Baudrate (**)	2 4800 bps 3 9600 bps 4 19200 bps			W					●

| Offset	Parameter	Description	Scale	Measuring unit	Type	Active Driver	ADAC-MCE	e.Syline	e.Box	DConnect Box
2C	DConnect box reboot	0 reset only micro 1 reset DConnect Box			W					●

(*) this control physically identifies the device by flashing the display or acoustic sounds in the case of the DConnect Box.

(**) in order to act these commands, they have to be executed sequentially.

3.4.1. Change parameters by webApp

To configure the system in a more intuitive, simple and fast way, you can take advantage of the DConnect webAPP, already used for updating the DConnect Box.

To change the parameters via the Modbus protocol, see the example shown in paragraph 3.8.1 (Change DConnect Box Configuration).
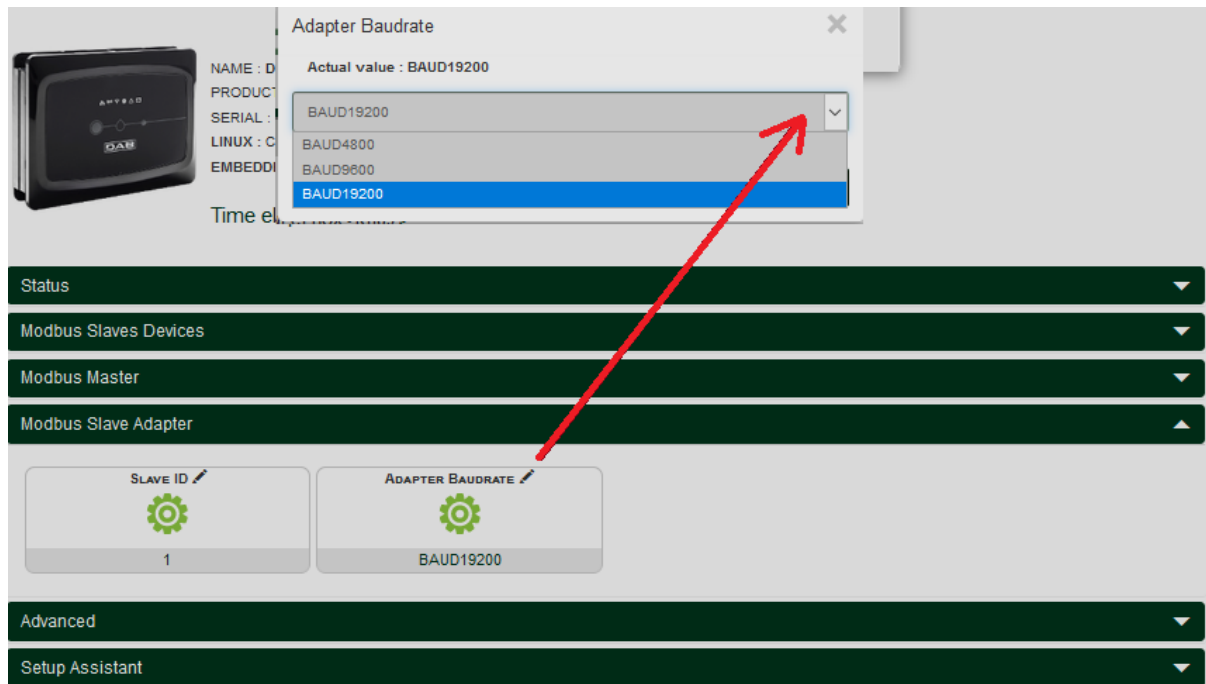
3.5. System Status and Errors

Errors	Active Driver Plus	ADAC MCE-P	e.Syline	e.Box	Type
Shot circuit HV	18,19,20	18,19,20	18,19	13,83,84	error
Voltage error	21,23,24,25,26,27,38	21,23,24,25,26,27	25,27,28,29,30,31	17,18,19,	error
Overload input	28,29,30	28,29,30	32,33,		error
Operation mode change				10	error
Keys error				12	error
V Selector error				14	error
Relay/contactor alarm				25,79,80	error
Not configured				32	error
Too high start frequency				35,85,86	error

Errors	Active Driver Plus	ADAC MCE-P	e.Syline	e.Box	Type
Locked pump				59,87,88	error
Inconsistent fl. sw. status				70	error
Inconsistent lvl prb. status				71	error
Incons. pressostats status				72	error
Depth sensor				74	error
Internal error	1-16,17,22	1-16,17	1-16,17,20, 21,22,23,24,26	1-16,20,21,29, 38,39,50, 51,54,55,63	error
Warnings	**Active Driver Plus**	**ADAC MCE-P**	**e.Syline**	**e.Box**	**Type**
Over temperature	33,34,35,36,37	33,34,35,36,37	35,36,37,38		warning
Low voltage LP	39	38	39,40,	23	warning
High voltage HP	40	39	41	24	warning
Over current	41,42	40,41	42,43	26,75,76	warning
Input voltage				22	warning
Dry run	45	47	49	34,81,82	warning
Hot pump PH	48	46	46		warning
Over power OP			44		warning
Pressure sensor BP	49, 50,51	48,49,50	50,51,52,	73	warning
Anti-cycling AY	56		57	53,89,90	warning
Pump oscillation PO		55			warning
Plant error WP		56			warning
Disconnected pump			53	27,77,78	warning
Fluid hot HL			54		warning
Over pressure			55	37	warning
Loss LK			56		warning
Min level				41,44	warning
Max level				42, 45	warning
Max pressure pressostat				64	warning
Min level float switch				65	warning
Min level probe				66	warning
Max level float switch				67	warning
Max level probe				68	warning
Min pressure pressostat				69	warning

3.6. Product Type

The following tables represent the product types for the product families.

The product type can be obtained with offset register 001A.

FAMILY	VALUE	PRODUCT TYPE
Active Driver Plus	41	M/M 1.1 kW 8.5 A
	42	M/M 1.5 kW 11.0 A

FAMILY	VALUE	PRODUCT TYPE
	43	M/M 1.8 kW 14.0 A
	44	T/T 5.5 kW 13.3 A
	45	T/T 3.0 kW 7.5 A
	46	M/T 2.2 kW 10.5 A
	47	M/T 1.0 kW 4.7 A
	48	T/T 5.5 kW 13.3 A
	49	T/T 3.0 kW 7.5 A
	50	M/T 2.2 kW 10.5 A
	51	M/T 1.0 kW 4.7 A
	52	M/M 1.8 kW 14.0 A
	53	M/M 1.5 kW 11.0 A
	54	M/M 1.1 kW 8.5 A
	11	ADAC T/T 15
	12	ADAC T/T 11
	13	ADAC T/T 7.5
	14	ADAC T/T 5.5
	15	ADAC T/T 4.0
	16	ADAC T/T 3.0
	17	ADAC M/T 2.2
	18	ADAC M/T 1.5
ADAC / MCE-P	19	ADAC M/T 1.0
	20	MCE-P 150
	21	MCE-P 110
	22	MCE-P 55
	23	MCE-P 30
	24	MCE-P 22
	25	MCE-P 15
	26	MCE-P 11
e.Syline	65	e.sybox 1.5 kW NP
e.Box	77	EBOX Basic D
	78	EBOX Plus D

3.7. Addition of a new product and replacement

Each product family can virtually contain up to 16 devices. Once connected to the DConnect Box, a pump will receive a unique serial port and will occupy the first free position of the 16 available. This position will remain occupied even if the pump is switched off or replaced. To refer to the next pump of the same family present in the system, an offset of 0x0100 must be added.

For example: Installation consisting of 3 MCE-Ps and an Active Driver Plus. Supposing there is a failure of the MCE-P in the second position (offset 0x5100). The new MCE-P will occupy the first free position within the registers assigned to that family, so it will have an offset of 0x5300.

N°	Family	Original offset		Replacement of MCE-P no. 2
1	MCE-P	0x5000		0x5000
2	MCE-P	**0x5100**	**-> Replacement ->**	**0x5300**
3	MCE-P	0x5200		0x5200
4	Active Driver Plus	0x0000		0x0000

NOTE: the DConnect Box manages up to a maximum of 8 pumps but this number may vary depending on the complexity of the installation. It is advisable to contact the DAB Customer Service for a large number of pumps.

3.8. Examples

3.8.1. Changing DConnect Box configuration

To ensure proper operation within the supervision system, the slave address and the serial data rate of the DConnect Box must be set.

To avoid losing communication with the device, the two registers must be written sequentially, using Function Code 16 (Preset Multiple Registers).

If the operation is successful, an acoustic signal ("beep") will be emitted from the DConnect Box. See example below.

a. Configure the DConnectBox with the Modbus address 100 and baud rate 19200 bps:

Slave Address	Function Code	Offset	Value	CRC
01	10	2060	0064	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family + Offset Position + Offset Parameter 0x2000 + 0x0000 + 0x0060	100 HEX = 0x0064	
01	10	2061	4	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family + Offset Position + Offset Parameter 0x2000 + 0x0000 + 0x0061	4 = 19200	

* YYYY CRC16 calcolato.

b. Then modify the baud rate with 9600 bps.

Slave Address	Function Code	Offset	Value	CRC
64	10	2060	0064	YYYY *
DConnectBox Address 100	Preset Multiple Registers	Offset Family + Offset Position + Offset Parameter 0x2000 + 0x0000 + 0x0060	100 HEX = 0x0064	
64	10	2061	3	YYYY *
DConnectBox Address default	Preset Multiple Registers	Offset Family + Offset Position + Offset Parameter 0x2000 + 0x0000 + 0x0061	3 = 9600	

* YYYY CRC16 calcolato.

3.8.2. Example of Parameter reading

Consider a system consisting of two ADACs and an e.sybox.

a. Pressure request in Bar of the **first ADAC**:

Slave address	Function Code	Data				CRC
01	03		1020			YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter	0x1000 +	0x0000 +	0x0020	

Note: (MS_Measure System set as International)

b. Pressure request in Psi of the **second ADAC**:

Slave address	Function Code	Data				CRC
01	03		1120			YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter	0x1000 +	0x0100 +	0x0020	

Note: (MS_Measure System set as International)

c. Power output request of the **e.sybox** (scale 0.001kW):

Slave address	Function Code	Data				CRC
01	03		4028			YYYY *
DConnectBox Address	Read holding registers	Offset Family + Offset Position + Offset Parameter	0x4000 +	0x000 +	0x0028	

Note: (MS_Measure System set as International)

* YYYY CRC16 calculated.

3.8.3. Example of Parameter writing

Consider the same system consisting of two ADACs and an e.sybox.

a. Setting of the pressure setpoint in Bar of the **second ADAC** at the value **3.3 Bar**:

Slave address	Function Code	Offset				Value	CRC
01	06		111C			0021	YYYY *
DConnectBox Address	Write input registers	Offset Family + Offset Position	0x1000 +	+ Offset Parameter 0x0100 +	0x001C	3.3 / 0.1 = 33 HEX = 0x0021	

Note: (MS_Measure System set as International)

* YYYY CRC16 calculated.