



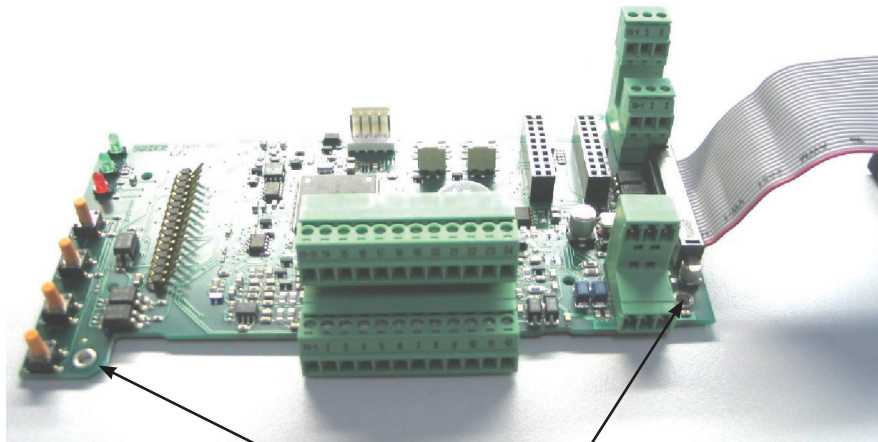
# Hydrovar<sup>®</sup>

## Variable Speed Control HV, 2 HP - 15 HP VERSION 0307

**SERVICE MANUAL**

### Section A

#### Troubleshooting the Control Card (using a Multimeter). Power Supply disconnected!!!



**GND Connection to Power Unit  
(attached via the screws)**

The following tests have to be made without connected cables.

#### 1) Internal Resistance - Digital Inputs:

Low Water

X3/1 (GND) - X3/11  
=> 90k Ω / 2.5M Ω

External ON/OFF (release)

X3/1 (GND) - X3/7 => 14k Ω

Configurable Digital Input (Digi 1):

X3/1 (GND) - X3/9 => 14k Ω

Digital Inputs (Dig 2 / Dig 3 / Dig 4):

X3/1 (GND) - X3/5 / 6 / 15  
=> 20k Ω

#### 2) Internal Resistance of the Analogue Current Inputs:

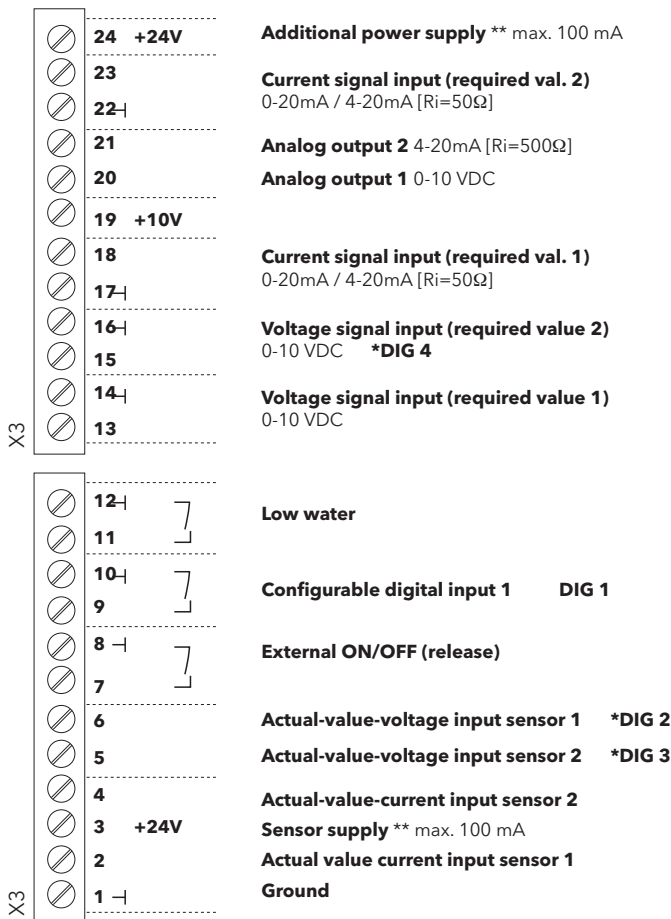
(Sensor 1/2 - Req. Val 1/2)

X3/1 (GND) - X3/2 / 4 / 18 / 23 => 50 Ω

#### 3) Capacity of Electronic Ground to Earth:

X3/1 (GND) - earth => 60nF

Important to bleed off Hf- Disturbances!



## Section A *(continued)*

**Troubleshooting the Control Card (using a Multimeter).**  
***Power Supply disconnected!!!***

### Note



**When the HYDROVAR is connected to power supply, the components of the power unit as well as certain Components of the Control Card remain under voltage.**

**Touching these components seriously endangers life!**

**All work, carried out at opened HYDROVAR, must be performed by qualified and authorized technicians.**

The following tests have to be made without connected cables.

#### 1) **Sensor Power Supply:**

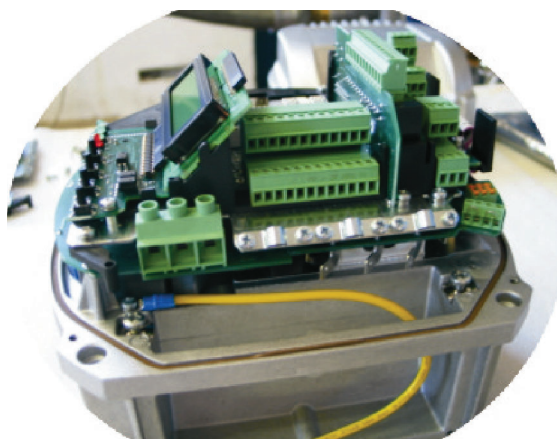
X3/1 (GND) - X3/3 => 24 VDC  
 X3/1 (GND) - X3/24 => 24 VDC

#### 2) **Internal Ref. for Analog Output:**

X3/1 (GND) - X3/19 => 10 VDC

#### 3) **Digital Inputs:**

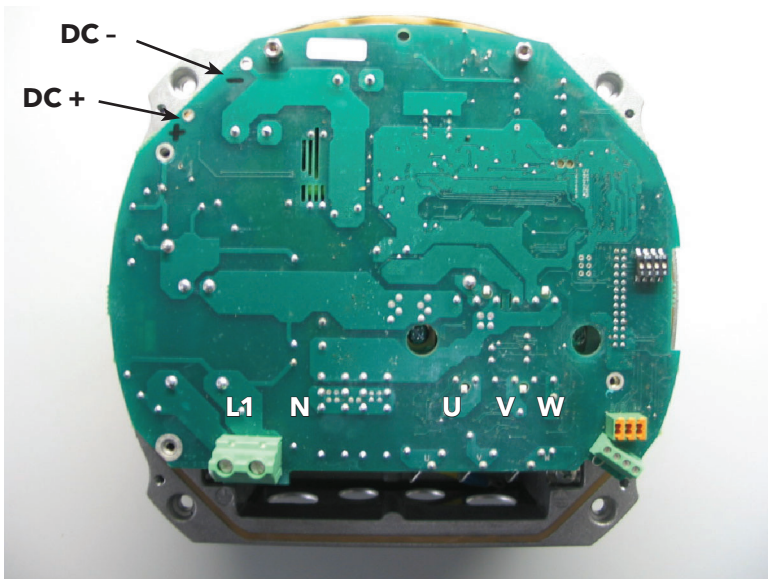
External On/Off	X3/ 7 - X3/8 (GND)	=> 5 VDC
Conf. Digital Input 1	X3/ 9 - X3/10 (GND)	=> 5 VDC
Low Water	X3/ 11 - X3/12 (GND)	=> 5 VDC



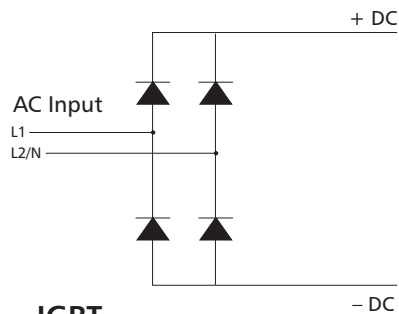
## Section B

**Troubleshooting the Rectifier and the IGBT Module (using a Multimeter).**  
**Power Supply disconnected!!!**

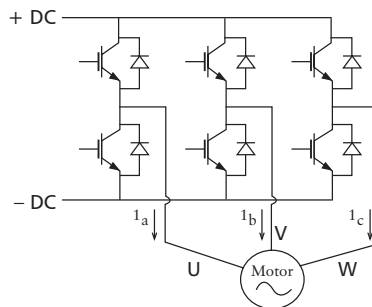
**Single Phase Unit HV 2, 3 HP**



**Rectifier**



**IGBT**



## Commercial Water

Check the following values:

Black Wire (GND)	Red Wire of Multimeter	Result
<b>Rectifier Values</b>		
L1 N	DC+	OL (Overload)
L1 N	DC-	0.54 V
DC+	L1 N	0.57 V
DC-	L1 N	OL (Overload)
<b>IGBT Values</b>		
DC+	U V W	0.48 V
DC-	U V W	OL (Overload)
U V W	DC+	OL (Overload)
U V W	DC-	0.45 V

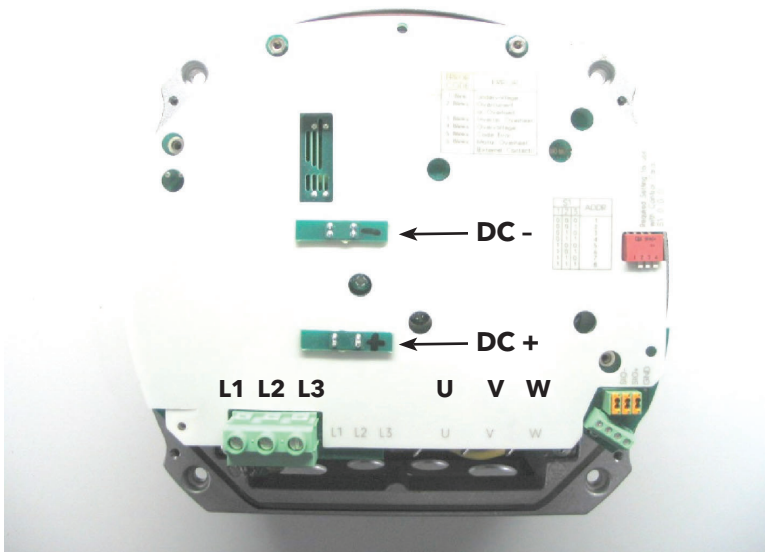
**NOTE:** Put multimeter on diode check (→|←).

### **Result:**

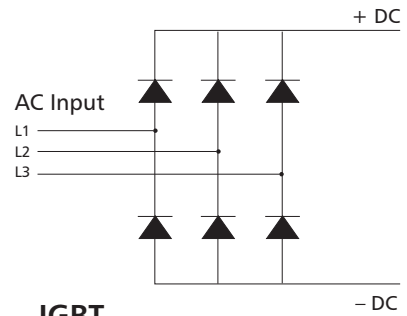
- If the above mentioned values between power supply and DC part are significantly different  
=> **Rectifier** may be damaged.
- If values between motor connection and DC part are significantly different  
=> **IGBT** module may have a failure.

## Commercial Water

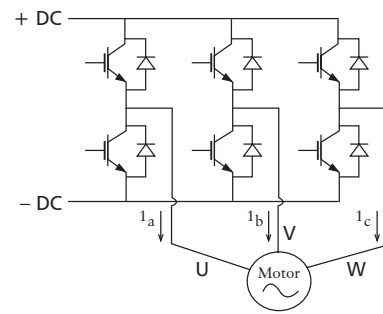
### Three Phase Unit HV 3, 5 HP



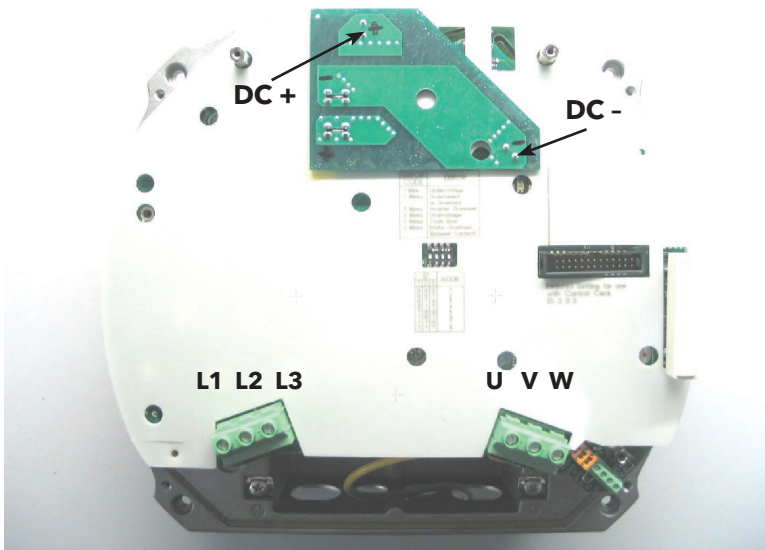
#### Rectifier



#### IGBT



### Three Phase Unit HV 7.5, 15 HP



## Commercial Water

Check the following values:

Black Wire (GND)	Red Wire of Multimeter	Result
<b>Rectifier Values</b>		
L1 L2 L3	DC+	OL (Overload)
L1 L2 L3	DC-	0.40 - 0.54 V
DC+	L1 L2 L3	0.40 - 0.54 V
DC-	L1 L2 L3	OL (Overload)
<b>IGBT Values</b>		
DC+	U V W	0.420 - 0.635 V
DC-	U V W	OL (Overload)
U V W	DC+	OL (Overload)
U V W	DC-	0.40 - 0.45 V

**NOTE:** Put multimeter on diode check ()

### **Result:**

- If the above mentioned values between power supply and DC part are significantly different => **Rectifier** may be damaged.
- If values between motor connection and DC part are significantly different => **IGBT** module may have a failure.

# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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