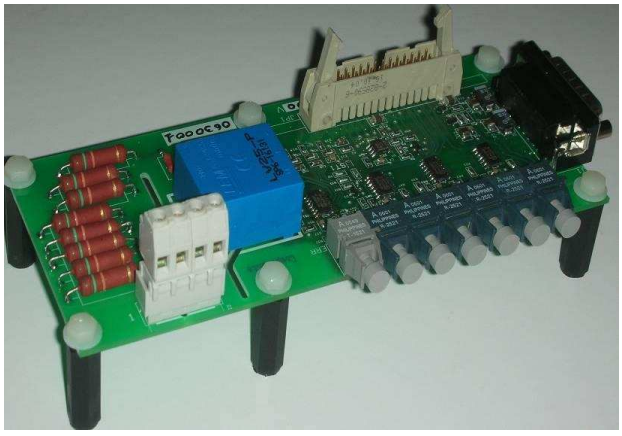
ARCAL FO E+

Fibre distributed data interface for ARCAL-E+210 drivers

The ARCAL-FO-E+ board is a fibre distributed data – control signals interface. It enables to drive an ARCAL-E+210 board mounted on an Econopack+ module in a three-phase structure. Basically it enables to send the temperature measure of the IGBT done by the ARCAL-E+210. It can also measure the Bus voltage of the stack where it is mounted.

This board is compatible with the ARC-MC-E+ too, which measures 3 phase currents and one Bus voltage, then processes and sends the defaults to the HE10 connector – 26 compatible pins with the ARCAL-FO-E+.

- **Fibre distributed data interface,**
- **Measure of DC Bus voltage,**
- **Board compatible with IGBT driver board ARCL-E+210 and the ARC-MC-E+ measuring board,**
- **Centralizes on an « Error » optical fibre the 3 IGBT defaults of the drivers as well as the temperature default.**



ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

CONTENTS

1. OPTICAL AND ELECTRICAL SPECIFICATIONS

Unless otherwise specified, all data are given at 25°C.

1.1. Supplies

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Positive rated power supply	14.5	15	15.5	VDC
Vss	Negative rated power supply	-14.5	-15	-15.5	VDC
I_{DD_0}	Total off-load current supply				mA

ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

1.2. Pin connections

J1 Connector (customer supply connector type DB15)

Pin	Symbol	Description
1	U-Iw	Data feedback for channel W current
2	U-Iv	Data feedback for channel V current
3	U-Iu	Data feedback for channel U current
4	Temp-Out	Data feedback for Econopack+ module temperature
5	U-DC1 ou U-DC2	Data feedback for the Bus voltage depending whether the measure is done on the ARCAL-FO-E+ or on the l'ARC-MC-E+ (Configurable)
7	+15V ou Vcc	+15V supply
8	-15V ou Vss	-15V supply
9, 10,11, 12, 13, 15	GND	Mass
6 et 14 NC	-	Not connected pins

ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

JP1 connector (driver connector type HE10 - 26 pins)

Pin	Symbol	Description
2	INB U	Control B for U arm
3	ERR U	Default feedback coming from the U arm (C.O.)
4	INA U	Control A for U arm
5	INB V	Control B for V arm
6	ERR V	Default feedback coming from the V arm (C.O.)
7	INA V	Control A for U arm
8	INB W	Control B for W arm
9	ERR W	Default feedback coming from the W arm (C.O.)
10	INA W	Control A for U arm
11	Over-Temp	Temperature default feedback (C.O.)
13	U-DC2	Measure of Bus voltage coming from the ARC-MC-E+
16, 17	+15V	Supply +15V
18, 19, 21, 23, 25	GND	Mass
20	Temp-Out	Temperature default feedback processed by the ARCAL-E+210
1, 12, 14, 15		Non connected pins

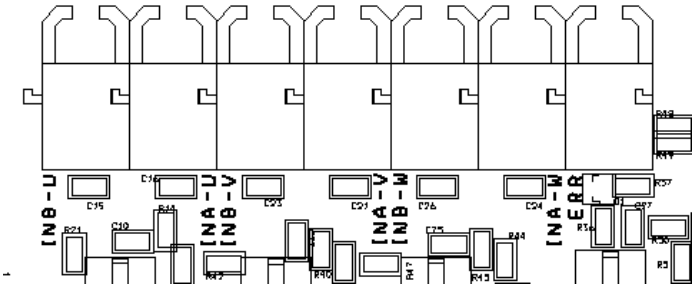
J2 connector (connector for the measure of Bus voltage)

Pin	Symbol	Description
1	+HT	Plus input of the Bus voltage
4	-HT	Minus input of the Bus voltage
2 et 3	-	Non connected pins

Optical fibre connectors

These optical fibre connectors are marked on the board itself. You have the receiving optical fibres for the 6 control channels INA - u, v, w and INB - u, v, w. The last emitting optical fibre sends a default which includes the 3 driver defaults and the temperature default.

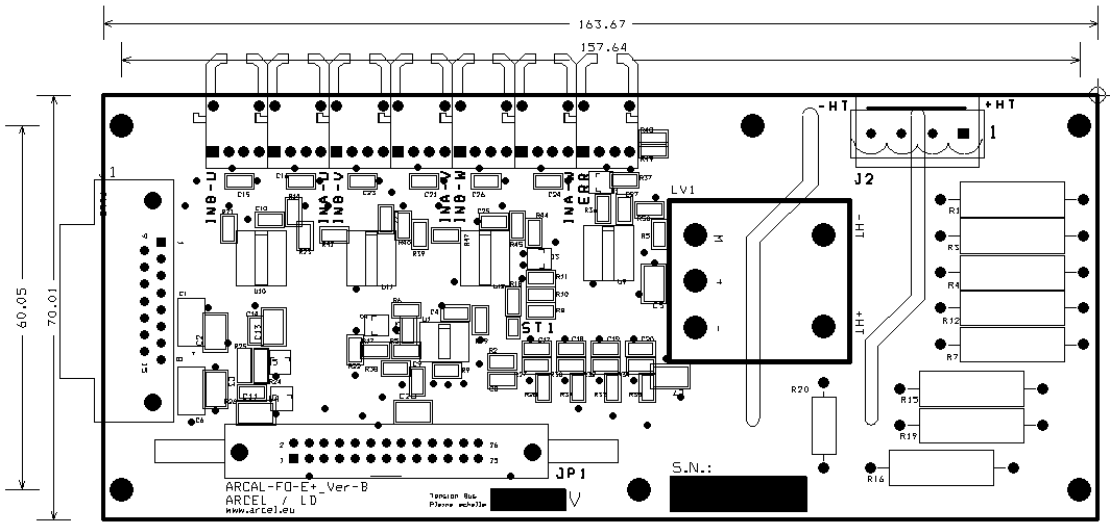
ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr



2. OPTICAL SPECIFICATIONS

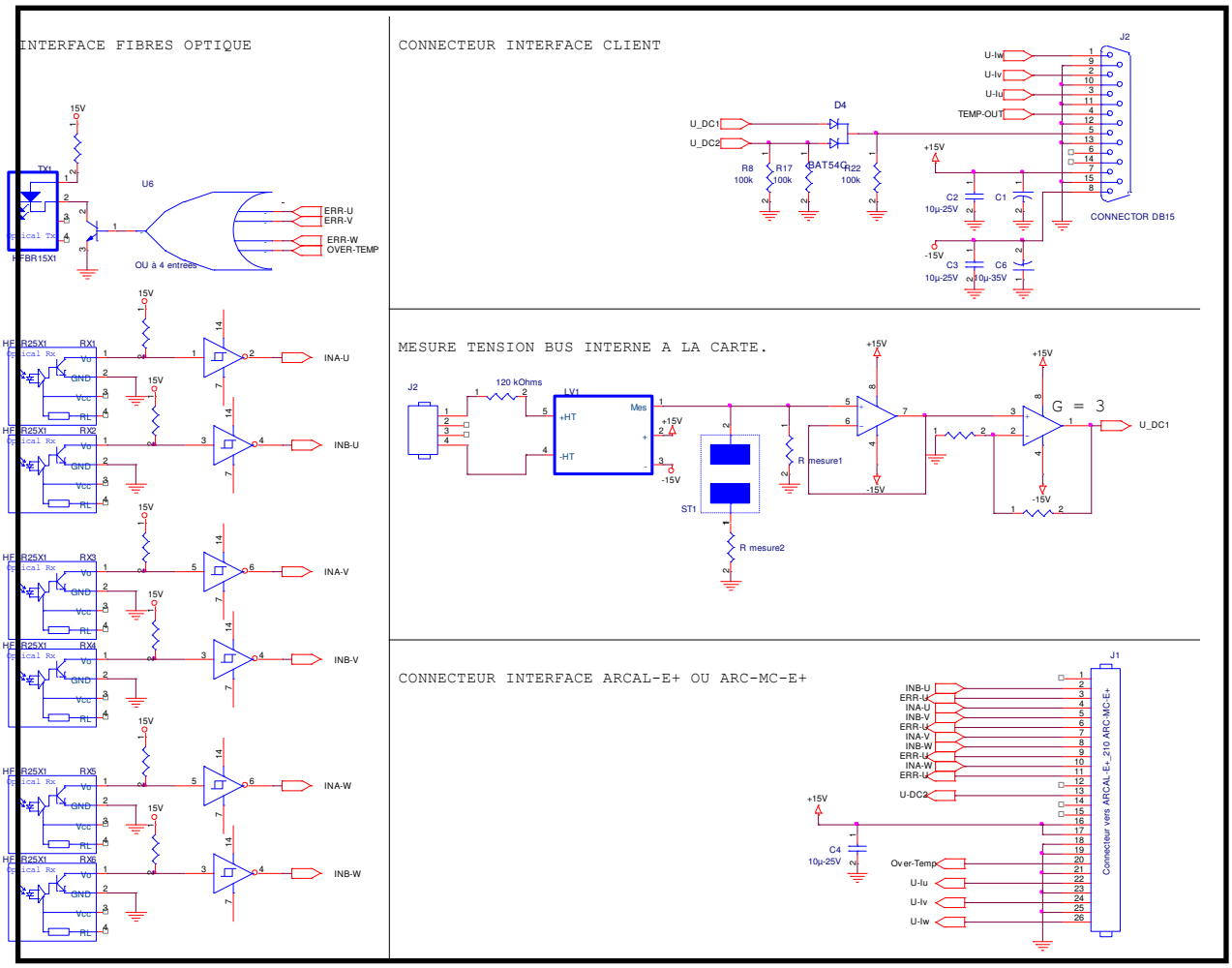
Symbol	Parameter	Min.	Typ.	Max.	Unit
TRM (10-90%)	Upwards reaction time (control signal & HE10 output)		250		nS
TRD (10-90%)	Downwards reaction time (control signal & HE10 output)	-	100		nS

3. MECHANICAL SPECIFICATIONS



ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

4. ELECTRICAL DIAGRAM



ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

5. MAIN SPECIFICATIONS

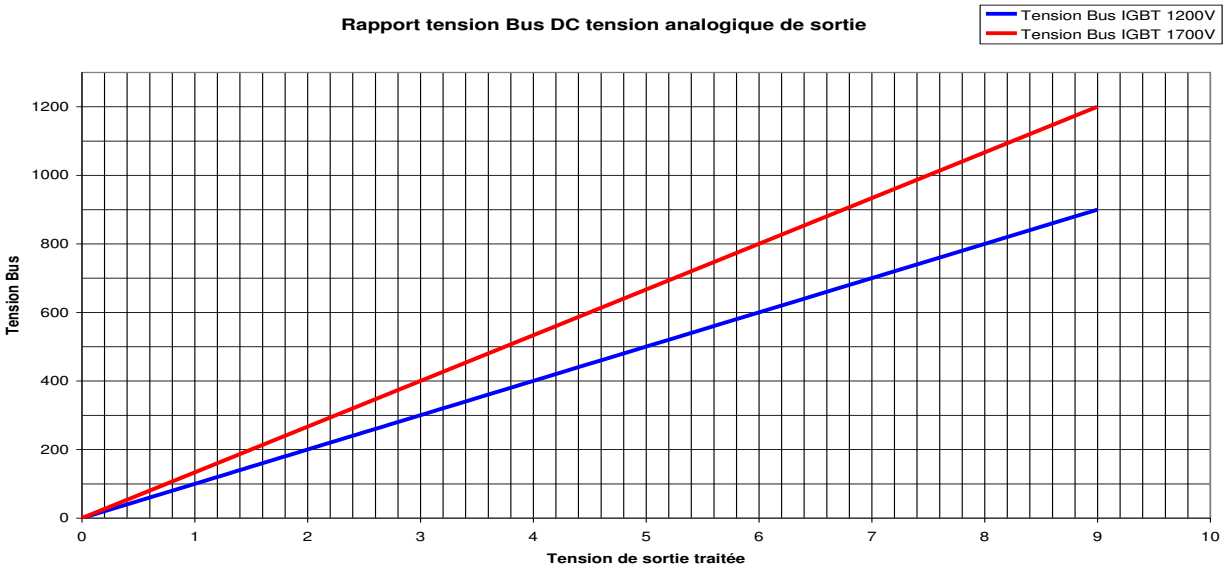
- DC supply voltage : ±15Vet 0V.
- The -15V input is planned to supply the voltage sensor as well as the electronic which enables the data processing.
- It enables to drive the ARCL-E+ board directly or to interface the ARC-MC-E+ measuring board between these 2 boards.
- It enables to make a measure of the Bus voltage and to process these data (marked U-DC1), when this option is available. This Bus voltage can be configured according to the IGBT that is used (1200V or 1700V).
- If it is cabled to an ARC-MC-E+, it can also forward the measure done on the measuring board (marked U-DC2).
- Again when it is cabled to the ARC-MC-E+ measuring board, it will send the measures of the 3 phase currents done by this board onto the customer connector.
- Sends the temperature measure done on the ARCAL-E+_210 driver board to the customer connector.
- Centralizes the default feedbacks of the 3 IGBT drivers as well as the temperature default created by the ARCAL-E+210 driver board and forwards a general default signal via a single optical fibre.

ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

6. BEHAVIOUR OF THE VOLTAGE MEASURE

Owing to this method, 2 types of voltage can be measured full scale.

- **For a 1200V IGBT**, which is the standard configuration, you will get the following for the full scale : **$900V_{DC}$ = 9V**
- **For a 1700V IGBT**, the "ST1" configuration strap must be short circuited. In this case, you will get the following for the full scale : **$1200V_{DC}$ = 9V**



ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr

7. CONFIGURATIONS

If you choose to measure the Bus voltage, you need to configure your board as follows:

	IGBT 1200V	IGBT 1700V
ST1	CO (std[1])	CC

No configuration is needed when the measure of the Bus voltage is done on the ARC-MC-E+.

[1] "Std" means that this configuration is the standard one on this board when the option is chosen.

ARCEL - ZI du Tronchon - 2, rue des Aulnes - 69544 CHAMPAGNE AU MONT D'OR Cedex - France
Tél. 33 (0)4 78 35 02 21 - Fax 33 (0)4 78 35 69 54 – www.arcel.fr