1. SCOPE

This specification defines the design features and the performances of the tight connector 47 ways for contacts MICRO TIMER II and STANDARD POWER TIMER.

The connector was developed for a use on motor vehicles for the connection of ABS controllers. Because of its waterproof constitution, this connector can be used for other applications in the driving compartment.

2. APPLICABLE DOCUMENTS

The documents quoted below constitute part of this specification, insofar as one refers there individually.

In the case of a contradiction between this specification and the documents quoted, this specification will have priority.

2.1. Tyco Electronics specifications

2.1.1. Customer drawings

Designation	Tyco Electronics P/N
47 ways assembled connector housing	953756-X
47 ways assembled cover	953759-X

2.1.2. Product specifications

108-18055-0 TYCO/ELECTRONICS Product specifications for contact MICRO TIMER II

108-18025-0 TYCO/ELECTRONICS Product specifications for contact STANDARD POWER TIMER

2.1.3. Spécifications d'application

114-18081-0 Application specification for contact MICRO TIMER II.

114-18037-0 Application specification for contact STANDARD POWER TIMER.

114-18018-0 Application specification of sealing single wire seal system.

114-18022-0 General Specification for direct application for the application of open barrel contacts.

98-52099-011 TYCO/ELECTRONICS Interface for 47 ways receptacle housing.

3. REQUIREMENT

Design and construction

It must be in conformity with the drawing of the product in its physical realization and its dimensions.

Materials

The indications appear in the drawing.
Used contacts : MICRO TIMER II to be crimped for single wire seal.
STANDARD POWER TIMER to be crimped for single wire seal

Characteristics

Nominal voltage	Continue voltage 14 Volts
Current limit	Contact MICRO TIMER II : max. 5 A with max. wire cross-section 0.75 mm^2 Contact STANDARD POWER TIMER : max 25 A with max. wire cross-section 4 mm^2
Number of mating/unmating cycles	20 (tinned contacts)
Global temperature range	- 40 °C to 100 °C
Protection / sealing	IP68 (300 mbars)

General conditions of test

All the tests carried out on the various parts must be in conformity with the directives of tests indicated.

- Minimum samples quantity : 5
- For the contact mechanics tests to see the corresponding specification.
- The samples should not present apparent damage.
- The samples must be in conformity with the current state of the drawings.
- One should use only series parts for the tests.
- The used wire must have a waterproof insulation, a sufficient undeformability under heat and present no damage.

Except particular specification, the tests are carried out under the following conditions :

- Temperature : 23 ± 5°C
- Relative humidity : 45 to +5%
- Atmospheric pressure : 860 à 1060 hPa

3.1. Requirements and tests

GENERAL EXAMINATION			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
GENERAL EXAMINATION		Examination with the naked eye	No harming defect
ELECTRICAL TESTS			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
CONTACT RESISTANCE		mV level method : Voltage test : ≤ 20 mV Test current : ≤ 50 mA	SPT Rc ≤ 4mΩ µT2 : Rc ≤ 6mΩ
		Specified current method: Voltage test ≤ 12 V Test current : 5 A/mm^2	SPT : Rc ≤ 4mΩ µT2 : Rc ≤ 6mΩ
ISOLATION RESISTANCE		Voltage test : 100 Vcc Between each contact during 1 minute	Ri : > 100 MΩ
WITHSTANDING VOLTAGE		Voltage test : 1000 Vca 50 Hz between each the contacts and other contact connected to the mass. Duration 1 min.	No breakdown No starting of arc
MECANICAL TEST			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
CONTACT INSERTION FORCES IN HOUSING		Manual insertion (double locking inactive) - double locking active	SPT : F ≤ 25 N for wire ≤ 3 mm^2 SPT : F ≤ 35 N for wirel > 3 mm^2 µT2 : F ≤ 25 N µT2 : F ≥ 50 N SPT : F ≥ 70 N
CONTACTS RETENTION IN INSULATOR		Apply to each contact a thrust load : Inactive secondary lock : Active secondary lock :	 SPT ≥ 100 N µT2 ≥ 80 N SPT ≥ 120 N µT2 ≥ 100 N
POLARIZATION AND CODING DEVICE		On a couple connector base plate of coding and/or different polarity Apply gradually, at the speed of 50 mm/min, a load until the value of 200 N is reached. To maintain during 10s. To release	No the possible coupling of the connectors
CONNECTORS LOCKING EFFECTIVENESS		Apply gradually, at the speed of 50 mm/min, a load until the value of 200 N is reached. To maintain during 10s. To release.	No the defect harming the correct operation
RECEPTACLE HOUSING COMPONENTS RETENTION			Must resist to 20 operations

MECANICAL TEST (END)			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
MATING FORCE AND LOCKING ON COUNTERPART		Apply gradually at the speed of 50 mm/min.	F ≤ 80 N
MATING FORCE IF THE SECONDARY LOCK IS NOT ACTIVE		Manual test	F ≤ 150 N
UNMATING FORCE		Manual test	F ≤ 80 N
CABLE HARDNESS RETENTION		Apply gradually, at the speed of 50 mm/min, a load until the value of 150 N is reached. To maintain during 10s. To release	Not defect harming the correct operation
AGEING TEST			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
MECANICAL DURABILITY		Numbers operations : 20 Speed : 100 mm/min Final measurement : contact resistance	Ri > 100 MΩ Rd > 1000 Vac
VIBRATIONS		Classe 1: Vibrations with VRT : -40 °C +100 °C 5hz : 0,5g to 1g 10 h : 2g 25 hz with 200 hz : 3g 200 hz : 3g to 1g 200 to 2000 h :1g Total duration 144 h (48h/axis) Current 100 mA	No open circuit higher than 1us Δ Rc ≤ 1mΩ SPT 5mΩ μT2
TEMPERATURE AND HUMIDITY DURABILITY		Wire : 500 mm temperature : 100 °C Test current SPT : 4A wire 2 mm^2 1,2 A wire 0.6 mm^2	
		360 times the following cycle : 45 min with current 15 min without current 4 contacts adjacents feed	μT2 Δ Rc ≤ 5mΩ SPT Δ Rc ≤ 3mΩ
		Then, to carry out 3 cycles 24 cycles of current like above with T = 85 °C and hr between 95 % and 99 %h 24 hours at ambient without current	μT2 Δ Rc ≤ 5mΩ SPT Δ Rc ≤ 3mΩ
RELIEVING OF THE CONTACTS		The mated connectors are subjected to a test with temperature of 48h to 125 °C	SPT Rc ≤ 4mΩ μT2 Rc ≤ 6mΩ
HELD IN VARIABLE ATMOSPHERE		5 cycles of 24h 4 h 23°C 75 % 1/2 h ↗ 55°C 99 % h.r. 10 h 55°C 99 % h.r. 2,5 h ↘ -40°C 2 h to maintain -40°C 1,5 h ↗ 125°C 2 h to maintain 125°C 1,5 h ↘ 23°C	μT2 Δ Rc ≤ 5mΩ SPT Δ Rc ≤ 3mΩ

AGEING TEST			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
THERMAL SHOCKS		The mated connectors are subjected to 100 cycles : 1 h -40°C 1h 125°C	SPT Δ Rc $\leq$ 4mΩ μT2 Δ Rc $\leq$ 6mΩ
CLIMATIC ENDURANCE		The connectors mated are subjected to 240H à +125°C	No defect harming correct operation
TESTS ANNEX			
TEST	**REF.**	**PROCEDURE**	**REQUIREMENT**
SEALING (IMMERSION)		Water tightness (300 hPa) 5 cycles of exposure : 30 mn 30 mn with the dry air with 125 °C 30 mn of total immersion in solution salt works to 5% in mass with 23°C depth 100 mm min.	No the malfunction Tension of behaviour 1000 V Eff 50 Hz Ri > 100 MΩ/100V
SHOCKS		Falls of the connector not wired a height of 1 m on a ground of concrete	No defect harming correct operation
IMPACT MOBILE MASSE		Mobile masse : 0,3 kg Drop height : 0,1 m Temperature : -30 °C	No defect harming correct operation
SECONDARY LOCK (LOCKING FORCE)		Manuel Test	10 N $\leq$ F $\leq$ 30 N
SECONDARY LOCK (OPENING FORCE)		Manuel Test	20 N $\leq$ F $\leq$ 60 N
ASSEMBLY OF LEVER ON COVER		Manuel Test	F $\geq$ 120 N
COVER ON HOUSING MOUNTING FORCE (LEVER IN WRONG WAY)		Manuel Test	F $\geq$ 100 N
RETENTION OF THE CAP ON PC		Manuel Test	F $\geq$ 150 N
LEVER HANDLING FORCE (MANUAL LOCKING)		Manuel Test	Manual locking test : F $\geq$ 120 N
LEVER HANDLING FORCE (MANUAL UNLOCKING)		Manuel Test	15 $\leq$ F$\leq$ 30 N
COVER ON HOUSING MOUNTING FORCE (LEVER IN RIGHT WAY)		Manuel Test	F $\leq$ 30 N
SECONDARY LOCKING INSTALLATION		All the contacts well positioned except One contact badly positioned	10 N $\leq$ F $\leq$ 30 N F $\geq$ 60 N

4. QUALITY INSURANCE MEASUREMENTS

4.1. Qualification test

The samples must be in conformity with the drawings and be taken in a random way in the current production.

4.1.1. Program approval tests

In the groups defined below, the connectors undergo all the tests in the chronological order of the tables :

TEST GROUP 2 (Accelerated ageing)

	Designation of the test
	Mating/unmating durability (1/2 nb cycles)
	Contact resistance
	Contact relaxation
	Vibrations test
	Contact resistance
	Variable atmosphere test
	Contact resistance
	Mechanical durability
	Contact resistance
	Locking of the connectors

TEST GROUP 3 (Endurance temperature/humidity)

	Test description
	Contact resistance
	Mating/unmating durability (1/2 nb cycles)
	Contact resistance
	Thermal shocks
	Contact resistance
	Temperature/humidity
	Contact resistance
	Insulation resistance
	Withstanding voltage

TEST GROUP 4 (connector locking)

	Test description
	Mating Force
	Unmating Force
	Mating/ Unmating durability (all cycles))
	Mating Force
	Unmating Force
	Connector locking

TEST GROUP 5 (Etanchéité)

	Test description
	Mating/ Unmating durability (1/2 nb cycles)
	Isolation Resistance
	Withstanding voltage
	Climatic durability 240H
	Mating/ Unmating durability (1/2 nb cycles)
	Sealing
	Insulation resistance
	Withstanding voltage

TEST OUT OF GROUP

	Test description
	Contact insertion in housing
	Contact retention in housing
	Contact polarisation in housing
	Connector polarisation
	Coding device
	Connector secondary locking
	Mating aide device
	Shock test
	Impact test
	Contact extraction
	Cable retention

4.2. Requalification test

If one carried out significant modifications which relate to the properties agreed upon for the level of the form or the function of the product or its method of manufacture, the competent development service will carry out a requalification test.

This test comprises a part or the unit of the initial output tests, according to the instructions given by the competent development service and the insurance quality service.

4.3. Reception

The reception is based on the proof that the product satisfied the requirements defined by item 3. The defects, which must be allotted to measuring apparatus, devices of measurement or errors of handling, should not involve a withdrawal of the qualification.

If it appears a defect on the product, one must take measures of correction and the qualification must be the subject of a new proof. Before this requalification, the result of measurements of correction must be confirmed by suitable tests.

4.4. Test and conformity

The conformance testing is carried out according to specific quality inspection plan of TYCO/ELECTRONICS which defines the limit of acceptable quality according to the sample number.
The dimensional and functional requirements must coincide with the production drawings and this specification.