



General Specification for Electrical/Electronic Subsystems and
Components

Part 1: General Specification for Electrical Signals and
Interfaces Requirements

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1 Scope and Application

1.1 Background

This specification, referred to as the GMI 12554, Part 1, defines the general requirements for electrical signals and interfaces of the electrical system in cars developed by GMIO. In the past, such requirements have typically been taken care of by component wise specifications, unfortunately not very unified or standardised. This fact has caused compatibility problems, e.g. when creating new variants of the electrical components involved.

Another goal is to minimize the overall effort of electrical engineering for electrically connected components in terms of specification and verification work. It will serve as a base of knowledge for the development of a robust electrical system.

The set of requirements and characteristics are based on some model concepts which are stated in the "Definition and Classification" specification, GMI 12556.

1.2 Content

GMI 12554, Part 1 includes requirements of the electrical signals and interfaces structured into general, electro-physical and electro-logical properties. Not included in this specification are bus and diagnosis interfaces. The requirement for this interfaces are not covered within this specification, they occur in separate specifications. Requirements for specific sensor or actuator signals are also not included in this specification.

GMI 12554 V, Part 1 of this specification includes requirements on verification related to these properties. GMI 12554 R, Part 2 up to GMI 12554 R, Part 15 include specifications of specific signals defined with the interface and signal properties of GMI 12554 R, Part 1 (see fig. 1).

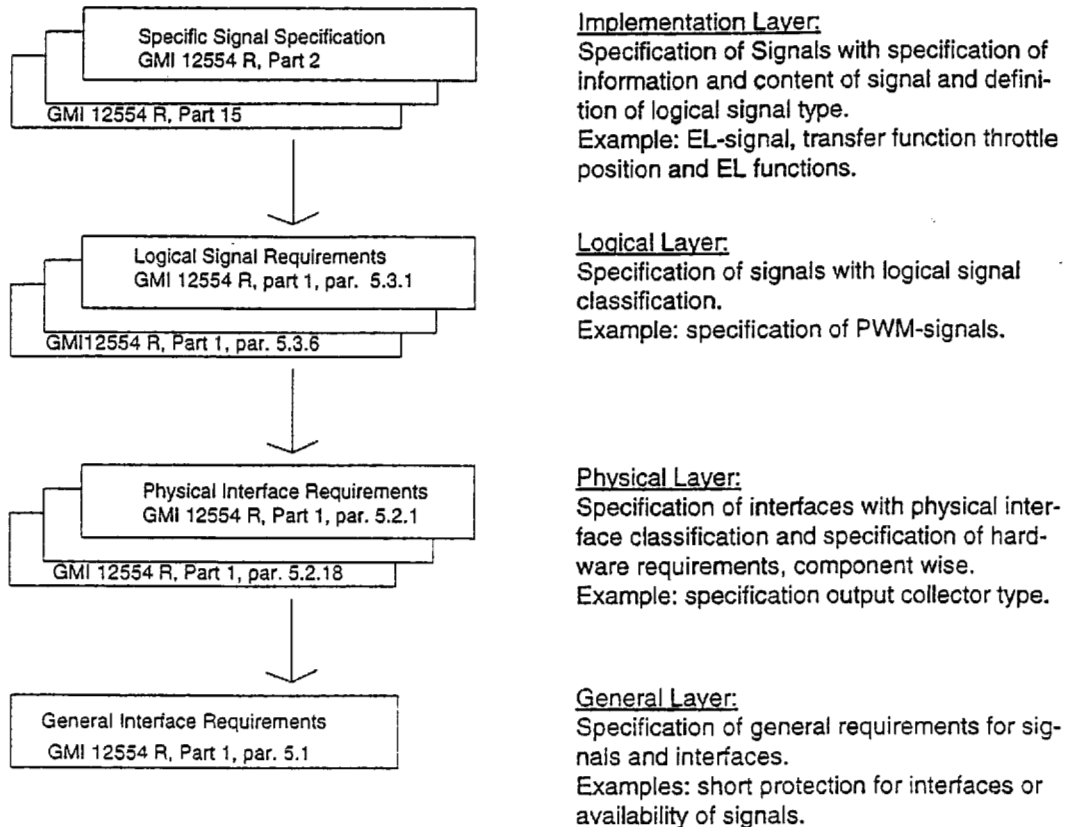


Fig. 1: Content and strategy of GMI 12554

1.3 Applicability of this Document

Engineers developing the electrical system with its ECCs shall select the parts of this specification that serves the purpose of their application. At present stage, GMI 12554, Part 1 primarily focuses on areas where standardisation gives the best effect such as a standard set of ordinary discrete level interfaces.

In order to promote company unification, developers dealing with electrical signals and interfaces shall adopt this terminology as far as possible in their relevant documentation.

1.4 Document Strategy

This document is part of a document family called "General Specification for Electrical/Electronic Subsystems and Components". The following documents types form the base of specifications:

Car or Component Individual Specification (Relevant Specification). Consist of relevant documentation typically covering requirements for one or several electrically connected components (ECCs). That could be e. g. a CTS or a SSTS or a GMI or a Technical Regulation.

Structure and Applicability, GMI 12537

Defines the structure and usage of the document family named above. Gives an overview for all applicable documents for electric/electronic components. Refers to many other GMIs like the GMI 12554.

General Specification for Electrical Signals and Interfaces, GMI 12554 R, Part 1 - this specification. Covers general requirements for Electrical Signals and Interfaces.

Specific Signal Specification, GMI 12554 R, Part 2 to GMI 12554 R, Part 15

Covers specific implementation requirements of Electrical Signals and Interfaces, which may be used for a particular purpose.

Example 1: The electrical signal and the interface properties are easily derived from the GMI 12554 R, Part 1.

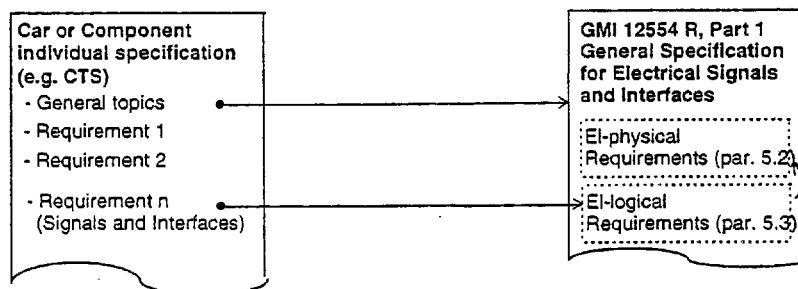


Fig. 2: Document strategy

Example 2: The electrical signal and the interface properties are more complex, a Specific Signal Specification (GMI 12554R, Part 2 to 15) is used.

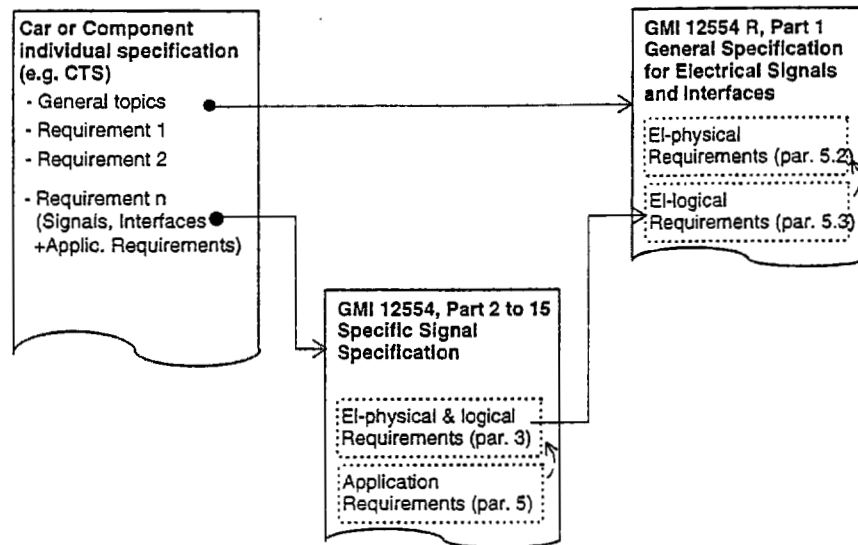


Fig. 3: Document strategy

GMI 12554, Part 1 consists of GMI 12554 R, Part 1 and GMI 12554 V, Part 1. GMI 12554 R, Part 1 determines the requirements. GMI 12554 R, Part 1 describes the test procedure.

2 References

2.1 Order of Precedence

Generally this GMI 12554, Part 1, presumes that application dependant requirements and descriptions shall be taken care of by relevant specification(s), e. g. Specific Signal Specification in Part 2 to 15 or a Component Specification. If a specific requirement is specified in both this specification and in the relevant specification, the relevant specification overrides the topic in this specification. The following order of precedence is valid for all of the requirements stated in this document:

1. Requirements stated in legal demands.
2. Requirements stated in the relevant specifications for the actual interface or signal (e. g. a VTS, Component drawing, etc.).
3. Requirements stated in this document.
4. Requirements stated in other GM International Standards.

Remark: In the event of a conflict between the English and the domestic language, the English language shall take precedence.

2.2 Government Documents

N. a.

2.3 General Motors Documents

2.3.1 GMIO

GMI 12537

General Specification for Electrical/Electronic Subsystems and Components. Structure and Applicability

GMI 12554 V, Part 1

General Specification for Electrical Signals and Interfaces

GMI 12554 R, Part 2:

Specific Signal Specification for Vehicle Speed (DFA)

GMI 12554 R, Part 3:

Specific Signal Specification for Engine Speed (TD/TN)

GMI 12554 R, Part 4:

Specific Signal Specification for Throttle Valve Position (EL/DKG)

GMI 12554 R, Part 5:

Specific Signal Specification for Engine Torque (ET/MMI)

GMI 12554 R, Part 6:

Specific Signal Specification for Torque Control (TC/GE)

GMI 12554 R, Part 7:

Specific Signal Specification for Torque Reduction (MMR/TR)

GMI 12554 R, Part 8:

Specific Signal Specification for Engine Torque Reduction via Engine Torque (ETR/MMS)

GMI 12554 R, Part 9:

Specific Signal Specification for Reduced Throttle Valve Position (DKGR)

GMI 12554 R, Part 10:

Specific Signal Specification for Gear Ratio (MIWG)

GMI 12554 R, Part 11:

Specific Signal Specification for Ti Signal

GMI 12554 R, Part 12:

Specific Signal Specification for Brake Light Switch Input (BLS)

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GMI 12554 R, Part 13:
Specific Signal Specification for Multiplex Signal
(MPX)

GMI 12554 R, Part 14:
Specific Signal Specification for Coolant Temperature PWM

GMI 12554 R, Part 15:
Specific Signal Specification for A/C Pressure PWM

GMI 12556
General Specification for Electrical/Electronic Subsystems and Components. Definition and Classification

GMI 12557
General Specification for Electrical/Electronic Subsystems and Components. Basic requirements for Electrical Systems and Components

2.3.2 NAO

N. a.

2.4 Industry Documents

SAE J1930; 06.93
Electrical/Electronic Systems; Diagnostic Terms, Definitions, Abbreviations and Acronyms

2.5 Supplier Documents

The following documentation shall be provided by the supplier at adequate development stages (for details, see paragraph 6).

- Internal Circuit Diagram of the ECC.
- Component List of internal components of the ECC.
- Interface Description of the ECC.

The documentation shall be under revision control.

2.6 Other Documents

N. a.

3. Note

N.a.

4 Definitions

4.1 General Definition and Classifications

For missing definitions, abbreviations and classifications see GMI 12556 Definitions and Classification.

4.2 Terminology

4.2.1 Abbreviations

ECC: Electric Connected Component, including all Electronic Control Units (ECU).

4.2.2 Voltage and Current Directions

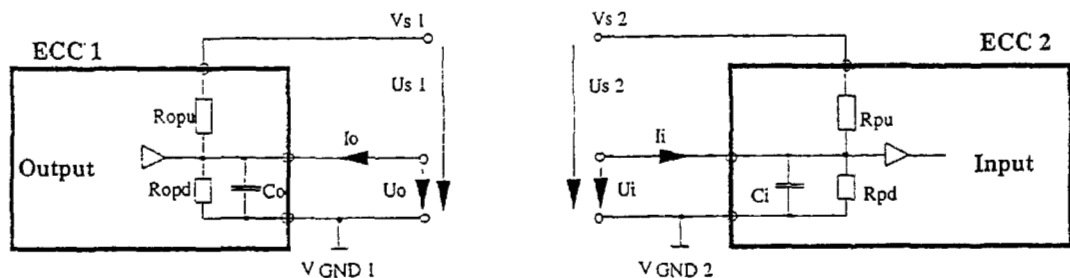


Fig. 5: Directions of currents and voltages, equivalent circuit for in and output

For definition all used voltages and currents are the quantities directly at the ECC terminals. All voltages are the differences in potential to the ECCs ground pin (V_{GND}), if not otherwise specified.