

Zeitschrift: Swiss express : the Swiss Railways Society journal
Herausgeber: Swiss Railways Society
Band: - (2018)
Heft: 136

Artikel: Vectoring in on Vectrons! : 'The Minuteman' recently went on patrol to seek-out Siemens Vectron Locomotives
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DOI: <https://doi.org/10.5169/seals-853782>

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Vectoring in on Vectrons!



'The Minuteman' recently went on patrol to seek-out Siemens Vectron Locomotives.

SBB CI Vectrons Nos. 464, 465, 475 and 476 at Muttentz - June 2018.

Photos: 'The Minuteman' except where shown

It wasn't my prime intention, but having recently acquired a digitally equipped HO-scale model of the BLS Cargo Re 475 (403-2) "Die Alpinisten" Multisystem Vectron locomotive manufactured by Siemens (Marklin 3-rail Ref: 36198/Trix 2-rail Ref: 22095), I decided to keep my eyes open in Switzerland on the off chance I might be lucky to

encounter one. My main focus was scouting to spot the "Classics in Decline", as *Today's Railways Europe* recently described the venerable SBB Re 4/4^{II}. I was not to be disappointed in my secondary quest and came across a handful of the new Vectrons in operation, or awaiting their next turn of duty. Without exception it was clear from the weathering patterns adorning these machines, they have been hard at work since their introduction. So what is the Vectron, and why its appeal to rail operators let alone model railway enthusiasts? It surely cannot be just its distinctive looks!

Delving into the press release information offered by Siemens Mobility, the Division of the German conglomerate responsible for its design and manufacture, it is clear a modular construction methodology has been adopted from the outset, so not only can units be delivered to meet the wide variety of immediate needs of purchasers, but they can also be 'easily' (a relative term I detect!) retrofitted or converted as changing customer needs arise. Unlike areas of the world such as the United States of America where the Federal Railroad Authority sets Nationwide 'standards' and manufacturers can adopt a 'one-size-fits-all', when it comes to the 'United States of Europe' the situation is considerably different. Despite the continuing efforts of the European Union, there is still and will be for a considerable number of years (or lifetimes?) to come, an enormous diversity of railway infrastructure, gauges, signalling, safety systems and so forth, grown up from the advent of railways in the 19thC. Thus the need for the modular approach in locomotive design to be able to meet customer demands of fast delivery with full



SBB CI Vectron MS showing the pantographs at Muttentz - June 2018.

applicable type approvals, whilst minimizing operational costs through turn-key maintenance support packages, is all part of modern locomotive delivery practice.

The Vectron was first introduced in 2010 at the bi-annual InnoTrans trade fair held in Berlin, and it came in four prototype versions - AC and DC Electric, Multi-System and Diesel. It is presently offered in five basic formats, the fifth being a split of the AC variant into 'High Power' rated at 6,400 kW with maximum speed of 200 km/h and 'Medium Power' 5,600 kW with maximum speed of 160 km/h. The electric versions are also offered with a 'last mile diesel power' module from an auxiliary engine. The AC voltages offered are 25kv 50 Hz and 15kv, 16.67 Hz. The Multi-System offers both AC variants as well as two for DC 3kv and 1.5kv, while the DC version is offered at 3kv with maximum power of 5,200 kW. The Diesel version generates 2,400 kW while still offering a top speed of 160 km/h.

The electric versions have a length of 18,980mm, width of 3,012mm, height of 4,248 mm, wheel diameter of 1,250mm (when new!), wheelset arrangement is Bo-Bo, and starting tractive effort of 300kn. Weight naturally varies based on equipment and ballasting and is between 80t and 90t. The diesel version is longer, as one might expect (19,975mm), but also a little wider at 3,024mm which one might not! Height is slightly lower 4,223mm, new wheel diameter is smaller at 1,100mm, and starting tractive effort is less at 275kn. Weight is similar to the electric versions, again varying due to equipment and ballasting between 82t and 88t. The one different item of course is the fuel tank, which has a capacity of 4,000 litres. And the diesel motive power? It's provided by MTU of Friedrichshafen (founded in 1909 by Wilhelm Maybach and his son Karl and now owned by Rolls Royce Holdings) with their 16v 4000 R84 engine. All versions of the Vectron can be delivered for track gauges from 1,435 mm (4' 8 1/2" Standard Gauge) to 1,668mm (5' 5 21/32") Iberian Gauge. And the other important measure is maximum axle load set at 22.5t.

The modular concept, as reported by Siemens in their product information, includes: brake rack; traction-motor blowers; fire extinguisher system; auxiliary equipment rack; low voltage equipment cabinet; dynamic braking; oil and water cooler; traction converter; compressed air equipment; AC and DC high voltage equipment cabinets; train protection cabinets, and diesel power modules. If this wasn't sufficient the modularity deployed extends beyond the multi-traction, to include standardized and modular 'drivers desk' options (what happened to the word 'cab?'), crash-absorbing replaceable front ends (comforting to know – at least for some and perhaps not for others!) and when it comes to bogies, either "pinion hollow-shaft" or a "quill drive" can be installed (ask a railway engineer for an explanation of these!). Not to be left out, multiple couplings in the form of different combinations of spring mechanism and coupler head, whether screw coupling, central buffer for heavy freight or passenger applications. Perhaps we modellers now know why there are so many varieties of couplers in the hobby market –

A Siemens Press advert showing the Vectron Figures in 2017 on the 500th sold. *Siemens image.*

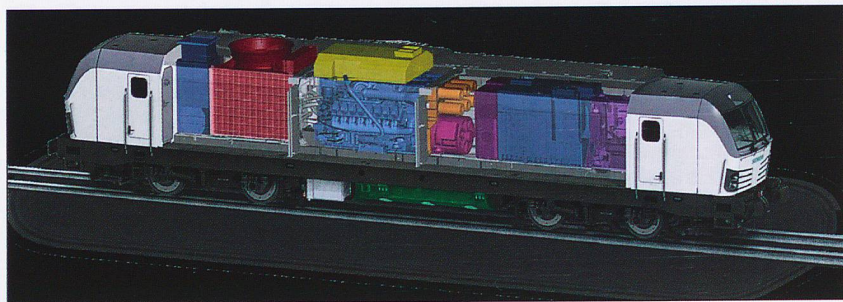


TOP: BLS Cargo No.409 Vectron at Spiez - June 2018.
BOTTOM: railCare Vectron No.476 455 on a freight at Immensee - June 2018.

even those working to 1:1 scale haven't standardised!

Proactive certification has been pursued by Siemens to avoid delivery delays to customers and this has helped achieve a significant order book of close to 1,000 at the time of writing, ranging from single unit orders up to a recent order for 200 for OBB in a framework contract comprising 100 AC units, 50 AC plus 'last mile diesel power' module units, and 50 Multi-System units. Vectron variants to be seen in Switzerland include BLS Cargo ordering 15 Multi-System units in 2015 for operation in Germany, Austria, Italy, Netherlands, as well as for trans-alpine freight workings in their home country. More recently, other operators in





TOP: A drawing showing the Vectron Diesel Version - Siemens image.

ABOVE: A drawing showing the Vectron MS and AC Versions - Siemens image.

BELOW: railCare Vectron 476 452 passes Ausserberg - June 2018.



Switzerland utilising Vectrons include: railCare, who ordered 7 AC versions in 2016; 50 ordered by ELL (European Locomotive Leasing) also in 2016 - some have been reported with joint ELL/SBBCargo graphics (and modelled by Marklin Ref: 36193); Hupac who ordered 8 Multi-System units in 2017; LokRoll AG with 18 Multi-System locos in 2017 - and leased to SBB Cargo (Roco 73955/6 and 79956), and

MRCE (Mitsui Rail Capital Europe) who ordered 10 Multi-System units in 2017 (Trix Ref: 22094) and then 20 Multi-System and 5 AC in 2018.

It is understood that Vectron class locomotives received certification in January 2014 under the EU 'Technical specification for interoperability for Locomotives and Passenger rolling stock' (Decision 2011/291/EU). Operation certifications for various European administrations have been received and these are summarized in the following homologation overview available at the time of writing from Wikipedia. Interestingly, and I quote "homologations" which cannot be clearly assigned to the locomotive's electric system were assumed on the basis of neighbouring countries and current systems and are given in brackets (x) in the following table"

Country	Multisystem	AC	DC	Diesel
Austria	x	x		x
Bulgaria	(x)	(x)		
Croatia	x	x		
Czech Republic	x	x	x	
Finland		x		
Germany	x	x		x
Hungary	x	x		
Italy	x		x	
Netherlands	x			
Norway		x		
Poland	x		x	
Romania	x	x		
Serbia	(x)	(x)		
Slovakia	x	x		
Slovenia	x			
Sweden		x		
Switzerland	(x)	(x)		
Turkey	x	x	x	x

The price of purchasing Vectrons is normally commercially sensitive. However reports of the Polish PKP Cargo/Siemens contract to supply 15 examples was reported as €75m, or €3m a unit. Obviously this would vary depending upon variant, specifications and contract numbers.

For N-scale modelling enthusiasts, Vectron models are available from Kato in MCRE livery (Ref: H2968) and Fleischmann in SBB Cargo livery (Ref: 739304). 